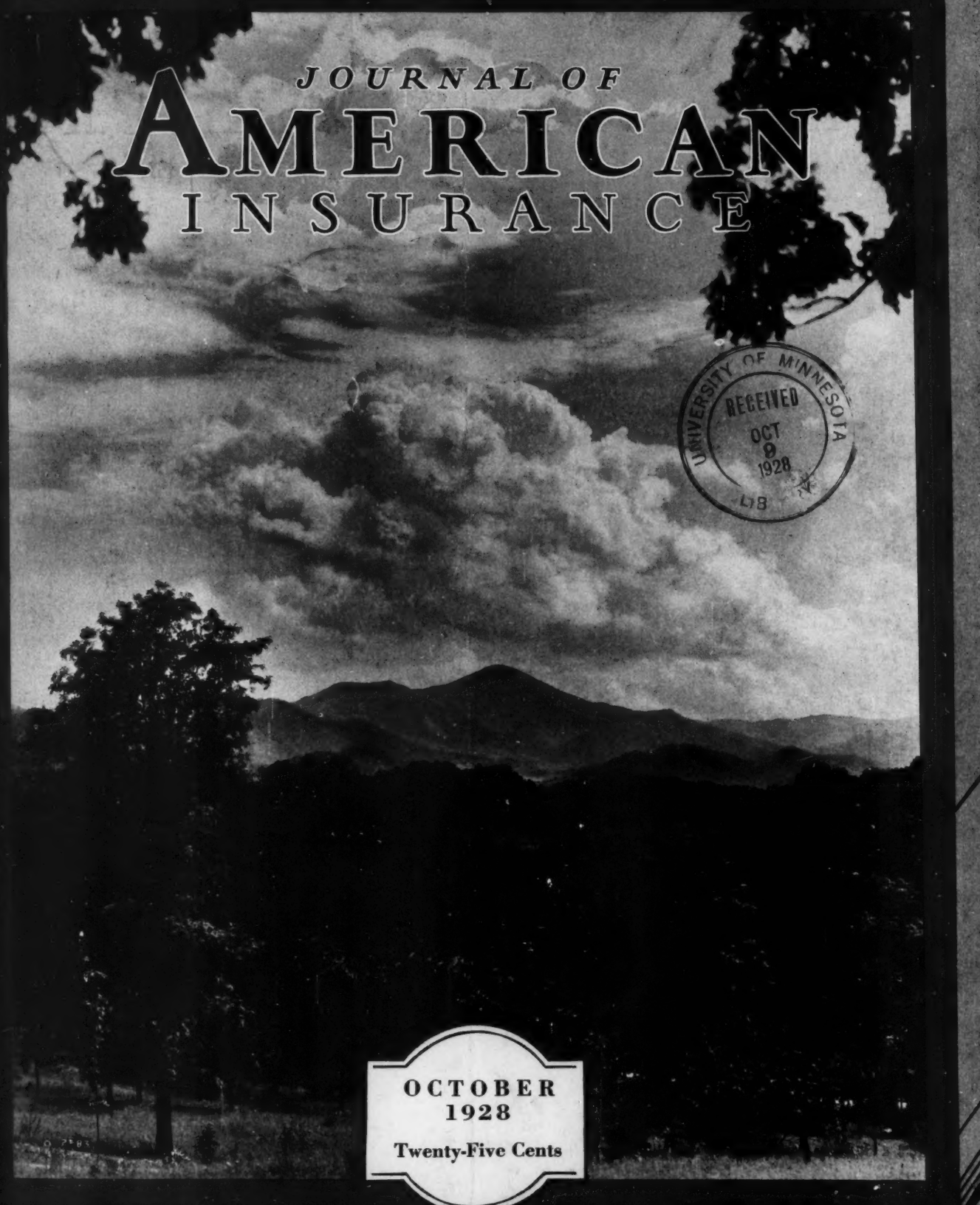
JOURNAL OF
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Twenty-Five Cents

Killed While Driving His Car Fully Insured---He THOUGHT

A fairly common occurrence gleaned from the daily papers—BUT—let's collect the insurance—and pay the damages and see what was wrong with the picture

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Paid from PUBLIC LIABILITY INSURANCE.

OTHER FELLOW'S CAR—Collected repair bill for $280.00
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2 STOLEN TIRES—$50.00 to replace
Paid from THEFT INSURANCE.

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"BEST AT TIME OF FIRE"

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Photo by P. & A.

AS FIRE TAKES ITS TOLL

FLAMES and Falling Walls, Explosion, Chaos and General Destruction Await As the Alarm Bells Ring and Smoke Begins to Rise. Every Hour of Every Day Marks Some Disaster by Fire.

Fidelity and Surety Underwriting

Insurance Against the Moral Hazard Involved In the Handling of Money and Materials By Employees of Corporations

By AVARD L. BISHOP
Professor of Business Administration
Yale University

ARTICLE II

SURETY BONDS

AS INDICATED in the first article of this series, there are several hundred different kinds of bonds issued by surety companies or by casualty companies with a surety department; and that these may be divided into two outstanding classes—fidelity bonds and surety bonds. The former already have been considered in the first article; the latter will be discussed now, beginning with court bonds.

Court Bonds

IN GENERAL, court bonds embrace all types of bonds required or permitted, under the law, to be filed either in court proceedings or because of actions undertaken by a court. Numerous forms of bonds fall within this general group, although they have been divided into two principal classes. In the first class, are bonds covering those who hold positions of trust, having received their appointment by an order of a court. Here would be included such officials as administrators, receivers in bankruptcy, and other fiduciaries. Bonds granting the necessary coverages in this general field have been called fiduciary bonds. In the second class of court bonds are those covering either party (the plaintiff or the defendant) in court proceedings. Bonds of this general class have been termed financial guarantees. We shall consider first the fiduciary type of court bond.

The person bonded always becomes a party to the bond himself in the position of principal, and in this capacity binds himself faithfully to fulfill his trust. The surety company bonding the principal also becomes a party to the bond as surety and in this capacity virtually insures that the principal will observe all the conditions of the bond. There are many situations in which fiduciary bonds of the court type are required to be filed as, for example, in the cases of administrators of estates, executors, guardians of incompetent persons, infants and others. State laws are not uniform with respect to the above, but in some states at least bonds are required in practically all of the cases instanced.

Fiduciary bonds fall naturally into two classes on the basis of their relative simplicity or complexity. Where the person to be bonded has only to distribute an estate, we have a fiduciary bond of the simplest type. If, however, a person is required to manage an estate for some considerable period of time, to attend to investments, and to see that the beneficiaries of the estate are paid an income year after year, the bond becomes of a more comprehensive na-

Photo by P. & A.

Times of Disaster Such as the Present Ruin in Florida Are Times of Great Human Temptations

ture and would fall with the second class. As might be supposed the first type of fiduciary bond is written for only a short period of time and involves relatively little risk; whereas the second type is more complicated, runs for a relatively long term, and contains a greater element of risk.

In the case of fiduciary bonds, the surety company, in the interests of self-protection, usually is allowed joint control of an estate when it has to be administered. In some states this became the almost universal practice some years ago, and the results were so satisfactory that the plan spread into other jurisdictions. The principle seems entirely sound resulting, as it does in most cases, in harmonious cooperation between the bonded individual and the bonding company. The interests of the real owner of a trust fund or an estate, for example, are thereby doubly safeguarded. Cash cannot be withdrawn by the fiduciary without the knowledge and consent of the surety company, nor can securities be reached in a strong box without a representative of the security company being present. Although this plan of protecting the surety company has proven to be ample in the great majority of cases, it is within the realm of possibility that the agent of the surety company might act in collusion with the person bonded.

IT HAS been said by authorities on corporate suretyship that the underwriting of court bonds of the fiduciary type is a highly technical and difficult matter and cannot be undertaken by inexperienced underwriters. Certain persons who have had a legal training have turned their attention to this form of underwriting and at times have been most effective; although, with this type of underwriter, there is said to be a likelihood of ultra-conservatism, because of his tending to stress too heavily certain risks, which, as a matter of practical experience, have been found to be unimportant.

When bonds have been issued covering receivers and trustees in bankruptcy proceedings, such parties from the surety standpoint are looked upon as being high-grade risks. Receiverships usually do not run for a very long time and the men appointed by the courts to perform such trusts are almost uniformly men of high moral standing. Because of the long term which bonds covering guardians are likely to run, it is necessary that they be issued with considerable discrimination.

The other type of court bonds referred to above are those required to be furnished by parties in litigation who are undertaking to secure some remedy in a court of law. Such bonds are almost universally required by statute. Inasmuch as their discussion involves a considerable knowledge of the law and of procedure, little will be said here of this subdivision of court bonds. As indicated above, there are court bonds designed either for the plaintiff or the defendant. They are conditioned upon all sorts of things, such as the payment of judgments or damages, or for the return of property, and so on. In general, in this type of bond the surety company does not undertake to assume risk, but to loan or pledge its credit to the amount of the bond, and until the bond expires. This enables the person requiring to furnish bond to use as desired his own money which, without the bond, would of necessity have to be deposited somewhere in satisfaction of a court demand.

Contract Bonds

AS THE name implies, contract bonds are designed to insure the performance of contracts as arranged. They embrace virtually the whole field of contractual relationships, and, therefore, are very comprehensive in scope. Cases where contract bonds would be in order and are actually purchased would be in connection with the construction under contract of buildings, roads, and other enterprises. Contract bonds also might be issued in connection with contracts covering the furnishing of materials for constructional purposes, and so on. One of the executive officials of a leading surety company has stated that his own company has furnished contract bonds covering constructional projects varying all the way from small undertakings costing a few hundred dollars to stupendous engineering works costing several millions of dollars. Not only do private business enterprises avail themselves of surety bonds covering contracts which they have let, but governments as well are common users of contract bonds. As a matter of fact, the purchase of contract bonds on the part of governments in the United States is said to be vastly more common than the purchase of such bonds by private business enterprises. Not only the Federal Government, but state, county, and lesser political units, seldom award a contract without requiring the successful bidder to furnish a bond guaranteeing the faithful performance of the contract in question.

The desirability of contract bonds in connection with the carrying out of building contracts, for example, can scarcely be over-emphasized. It is true, however, that their purchase in connection with such contracts is by no means universal. On the contrary, the greater proportion of building contracts, those covering also the furnishing of material for constructional purposes, and other related contracts, continue to be awarded in the non-government field without the furnishing of bonds. We are all aware of the fact that many of these contracts are carried out well within the time arranged for and with entire satisfaction to all parties concerned; nevertheless, it frequently happens that important contracts are abandoned before completion; or the contractor exceeds the specified time for the completion of the contract, sometimes by months or years; and that prolonged and expensive litigation often results from the failure to complete contracts as arranged.

THE contract bond furnished by a surety company is designed to prevent these irregular happenings and to absorb the losses and other unpleasant experiences that are pretty certain to occur without the purchase of contract bonds. The high-grade contractors when asked to furnish bonds usually manifest no resistance to the request. The cost of furnishing a contract bond to a high-grade contractor would be something like one and one-half per cent of the contract price, and this item doubtless could be added to the amount specified in the bid for the contract. The price of this service rendered by the surety company is a relatively small amount when taken into consideration with the obligations which it assumes.

From the underwriting standpoint, contract bonds, it is said, furnish problems peculiarly their own. In the case of constructional contracts, one of the leading underwriting problems to be met is related to the cost of the contract and the amount of the contract bond asked for in relationship to the net worth of the contractor. Another factor to be taken into consideration is the volume of other work that the contractor is committed to. Still another underwriting problem is related to the past experience of the contractor in question in constructing similar works, and his general reputation in his own

(Continued from Page 22)

Mutuals in National Convention

Milwaukee Gathering in Session to Consider Important Mutual Problems aad Promote Acquaintance Among Delegates

NOW in session at Milwaukee, is the Annual Convention of the Federation of Mutual Fire Insurance Companies and the National Association of Mutual Insurance Companies. Attendance as judged by the advance reservations at the New Pfister Hotel and at the Schroeder apparently seems fully up to the high average of other similar gatherings in the past.

Promise of good weather, and the cordial expression of hospitality extended by the Wisconsin city, has operated to draw delegates from all parts of the United States, and the roll call indicated the universality of the Mutual idea in America.

The chief attraction, of course, is the program of addresses and round table discussions that is arranged to bring before the convention the livest of mutual topics, and current problems of large import to the insurance world. As said in our editorial page these talks will in truth constitute a college short course in insurance education, with experts in various lines giving to the delegates a fund of information, which probably could be collected nowhere else in so succinctly complete and easily understandable form.

Those now at Milwaukee are to be congratulated on their exceptional opportunity to see and hear outstanding men in the Mutual service, as they expound with fine enthusiasm the advantages of this better kind of protection.

The Journal of American Insurance, coming out on the very day that the convention is called to order, must postpone its account of the proceedings until another issue. But in subsequent numbers it is planned to present an account of the important work done, and such of the addresses as may be available for general publication.

In the meantime, Mutual folks everywhere may be proud of the high standards set by their national gatherings.

New Pfister Hotel

Schroeder Hotel
(Below at Left)

Type of Apartment Buildings Constructed by Metropolitan Life Insurance Company In Line with Policy of Improving Living Conditions

Investment Policies of Life Companies

Survey of the Disposition of Funds of a Great Organization Which Handles Millions Each Working Day

By LUTHER B. LITTLE
Mgr. Publicity Division
Metropolitan Life Insurance Company
of New York

IF YOU had over $650,000,000 a year and this belonged to other people who were handing it to you to invest for them, how would you invest it? What would you do with such a great amount?

Assuming that one-third of this had to be paid back each year, to people who had handed it to you, in the form of death claims, that a considerable amount was necessary "overhead" in the administration of the business, that considerable amounts of policy loans under the law had to be made, there would still remain more than $360,000,000 to be invested. This means roughly speaking a million and quarter of dollars a day for every working day to be invested otherwise. What form shall these investments take? It is a question constantly before the investing officers of this Company at least, for the income of the Metropolitan Life Insurance Company in 1927 was more than $650,000,000. The amount paid to policyholders was more than $280,000,000—being a mutual company the return of premiums or "dividends" amounted to over $68,000,000. Before discussing the principles governing the investment of funds it may be well to see just what investments it did make in 1927:

Farm Mortgage Loans	$ 30,127,561.78
Housing Mortgage Loans	118,911,857.42
Other Mortgage Loans	81,007,200.00
Government, State, Province, County and City Bonds	14,093,517.00
Railroad Bonds	59,533,057.12
Public Utility Bonds	48,184,576.76
Miscellaneous Bonds	14,717,646.41

It should be borne in mind that this money does not belong to the Metropolitan, the Company is simply acting as trustee for something like twenty-five millions of people who pay premiums to the Company that when the policies mature the amounts they call for may be paid. The money must be put to work so that it will at least draw the statutory interest of 3½ per cent, and while it is at work it must be safe because it belongs to other people who have given it to the Company to administer.

In speaking of the investment of this money of other people it must be borne in mind that under the laws, loans on outstanding policies may be made to the policyholders. Sometimes when they have paid premiums for a considerable time and the policy has not yet matured they need money and they borrow, under the law, certain amounts which are fixed by actuarial science. This money must be kept available at all times,

and while the companies as a rule do not encourage the borrowing on policies, because loans on policies decrease the protection for dependents which is the prime object of life insurance, still under the law it is a perfectly legal and probably in the long run a necessary procedure. The loans to policyholders, which have to be counted as among the investments, and figure in the assets, amounted altogether at the end of 1927 to more than $185,000,000. The loaning of this money, however, is not a part of the problem which those responsible for the management of the business have before them. They are loans made automatically under existing laws.

PROBLEMS of the Metropolitan are the problems of all mutual life insurance companies in greater or less extent depending on the number of policyholders and the amount of income. The management of a mutual company constantly has in mind that it is handling other people's money and it must be invested in a way that is primarily safe. Next, it must be invested to bring as large a return as possible, under the first condition of safety, and third, the investments must be, in the view of modern life insurance, so made as to best promote the interest of the people who own the money, which in the aggregate means the interests of the public. The responsibility is great.

The number of people insured in the United States in so-called "old line" companies may be roughly said to be almost half of the population. The great bulk of this is in mutual companies although there are some large stock companies. The management of the company has a responsibility in handling this money to this great number of policyholders, hence the needs of government, National, State, Municipal and the great corporations which promote industry, provide wages and meet the needs of modern civilization must be considered. Take first the necessities of government.

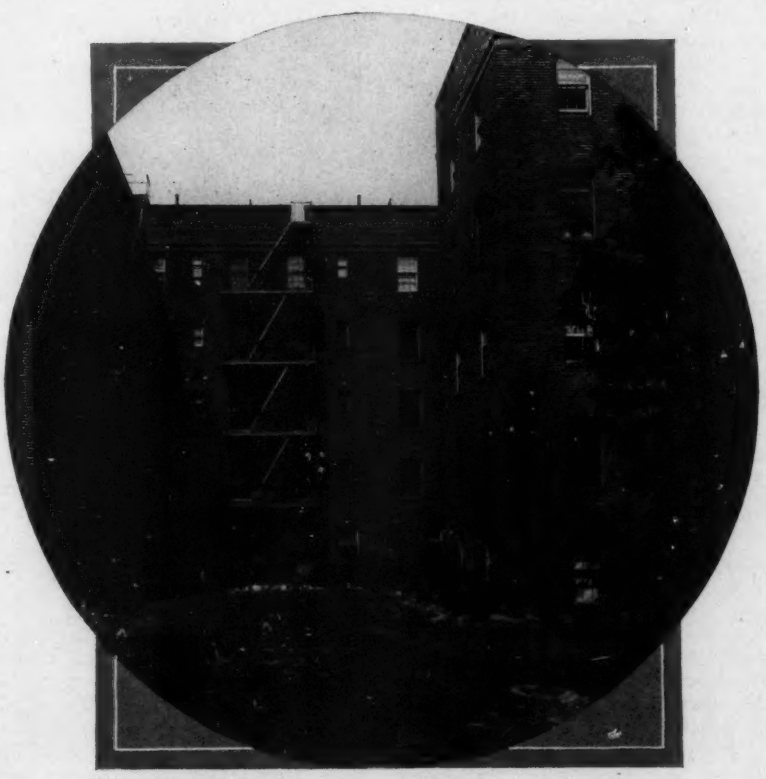
At the end of 1919 thirty-nine life insurance companies owned nearly $1,250,000,000 worth of federal, state, county and municipal bonds, which was almost 20 per cent of their entire assets. This country had been at war and the federal government had urgent need of borrowing money. The life insurance companies were the first to be appealed to and they were urged even to borrow money to invest in Liberty and Victory Loans. They responded to such an extent that over $700,000,000 worth of United States bonds were owned by these companies in 1919.

The needs of the public are another principle governing investments. In the history of transportation thirty or forty years ago what the country most needed was facility of communication, the opening up of the west to agriculture and the furnishing of necessities from manufacturing centres to farms, the development of mines and the transportation of metals and coal. The building up of cities near newly opened territory and the consequent organization of commerce, all indicated the use of capital for building railroads and equipment. So railroad securities were one of the principal forms of investment.

In countless cities of the country municipal needs ran parallel with the growth of these cities. Money was needed for development. Sewers were to be built; schools, hospitals, public buildings generally, and money had to be borrowed by the municipalities for this construction. The faith of the various communities was pledged to make good the loan.

In recent years public utilities such as telephone, electric lighting and power companies, water supply and kindred enterprises have been a necessity for the people and the companies promoting the development of these enterprises have called upon insurance companies for loans. Thus a considerable portion of the assets of the companies are invested in mortgage bonds of these public utilities corporations.

THE public need of cultivated farms and city dwellings, storage warehouses, shops and office buildings is another thing which requires the use of money for their development. Mortgage loans have generally formed the largest percentage of life insurance companies' investments. Just after the war there was a great demand for money for housing construction. During the war little building of houses had been done in all cities. There were other needs for the money and for workers, and as a result there was in 1920 such a housing shortage that something had to be done to meet a crisis. It is likely that a large number of policyholders were actually suffering because of the impossibility of securing adequate housing in the larger cities at rentals which they could pay. In this respect several of the large insurance companies began systematically to make mortgage loans for the building of houses. In 1920 the Metropolitan Life Insurance Company established a policy of loaning on small houses and apartments of



Another View of Improvements Sponsored by the Metropolitan

low rental to ameliorate the housing shortage and between 1920 and December 31, 1927, this Company authorized 92,207 such loans on dwellings and apartment houses. These will accommodate 154,516 families.

There was need for money to develop farms, and farm loans made for the six years amounted to over $197,000,000. Both the farm loans and the city loans were scattered in almost every state in the Union. In New York City loans on dwellings and apartment houses amounted to over $16,000,000 in 1927 alone, and in Michigan, California, Illinois, North Carolina, Pennsylvania, Minnesota, Washington and Oregon large amounts for the same purpose were loaned. The total amount of loans authorized in the seven years from 1920 to the end of 1927 was over $590,000,000.

Quite recently the press of the country had given consideration to the investments made by about thirty of the principal life insurance companies in the country. The amounts invested by individual companies are not given but for the week ending August 11th these companies loaned on bonds and mortgage, that is to say for housing, for business purposes, and on farms, $20,928,519. The amount invested in railroad securities was $1,447,524; the amount in Public Utilities, $3,284,538; Government securities, $2,456,603; miscellaneous bonds and stocks, $650,267.

These loans, particularly those on bond and mortgage, mean a wide distribution of a demand for building material—brick, mortar and cement, lumber and stone. They help pay the wages of workmen and the men who manufacture the raw material. On the farm it means the possibility of improvements and of less work to produce larger crops. In this way is seen the help which life insurance companies' investments gives to the entire country and as well as to that portion of the population which holds life insurance policies.

IN DISCUSSING life insurance investments about a year ago, Mr. F. H. Ecker, Vice-President of the Metropolitan Life Insurance Company, discussed in detail by more than 50 of the principal Life Insurance Companies, all manner of investments. What he said as to investments in Public Utilities will be of interest, not only to those who own the utilities, but to those who have the benefit of their service. He said:

"Investments in public utility securities have increased tremendously during the twenty-year period. In 1906, the companies had so invested $134,000,000 and they now have $819,000,000, representing an increase from 4.7% to 6.9% of total admitted assets. In 1906, the major portion of public utility investment was in street railways, whereas today by far the larger portion is invested in connection with companies supplying light, power, heat, telephone and other similar service for home and business uses and these investments are in the obligations secured by mortgages on the properties of the operating companies. As an illustration of how these investments tend to benefit individual citizens, it is reported that 17,000 new customers were added to rural electric lines in Pennsylvania during 1925 and that, throughout the United States, more than 1,000 farms per month are being added to the service lines of the different electric light and power companies. We also are told that the number of homes in the United States now served by electricity is about 15,000,000, having increased in the last six years from 6,000,000. Life insurance companies, owning, as they probably do, more public utility bonds than any other class of investors, are thus directing their funds into a channel of distinct service to the community."

On the subject of farm mortgage loans what he said was equally enlightening:

"Taking first then the subject of Mortgage Loans, let us briefly review the situation relating to farm mortgages. From 1906 to 1920, agricultural production and argicultural wealth were on a generally increasing scale year after year, which was rapidly accelerated by the influences arising out of the World War. With the depression which began in 1920, there was a marked decline in agricultural values. In 1921, the total farm indebtedness of the country was approximately $13,000,000,000, and this had declined in 1926 to $12,250,000,000. This figure relates to the farm indebtedness as a whole and not merely to the indebtedness represented by real estate mortgages on farms. Nevertheless, while the farm indebtedness was thus reduced $750,000,000, farm mortgage loans from life insurance companies increased $638,000,000. For the twenty-year period the farm mortgages of the life insurance companies increased from $268,000,000 to $1,960,000,000. Thus the life insurance companies furnish nearly one-sixth of the sum necessary to carry the farm indebtedness of the United States. Of the entire admitted assets of the companies, 9.3% was devoted to farm mortgages in 1906 and 16.5% in 1926."

SPEAKING broadly, the investing officers of life insurance companies are hedged about with state laws. The companies, generally speaking, are limited to those securities which may be owned and purchased by trust institutions, savings banks, etc. Specific lists of railroad bonds in which savings banks may invest are provided in some states for life insurance investments, by statute. Quite recently, namely in 1928, the legislature of New York modified the insurance law of the state to permit the purchase of certain stocks which could not legally be bought by insurance companies operating in that state. The qualifications for the new outlet for funds was carefully drawn and leaves something to the discretion of the investing officers, at the same time that especial care is taken that only those securities which are fundamentally safe may be invested in.

The question may arise as to how it is possible for an investing officer to make in six years 92,000 individual loans on dwellings and apartment houses, scattered in all parts of the country. This is done by the Metropolitan through a system of agencies —reliable banks and trust companies —which have a real estate department, and where property values, the standing of borrowers and whatever else contributes to a guarantee of safety in the loan can be attended to in these banks. They investigate carefully each proposed loan and it has been the experience of the Company that almost without exception they have been what may be called

(Continued on Page 31)

Inert Gas to Prevent Explosions

What Experiments in Dust Chambers of Grinding Equipment Have Developed Looking Toward a Greater Measure of Safety

By HYLTON R. BROWN

Associate Engineer Chemical and Technological Research, Bureau of Chemistry and Soils U. S. Department of Agriculture
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RECORDS for a 20-year period show that in feed-grinding plants alone the 30 principal explosions caused the loss of 60 lives, injury to 118 persons, and property damage amounting to approximately $5,000,000. The fact that 18 of these 30 explosions originated in the grinding equipment, where it was impossible to prevent the formation of dust clouds or eliminate sources of ignition, the two known methods of dust-explosion prevention, together with the knowledge that feed grinding was only one line of industry where the hazard existed, focused attention on the need for a method of preventing dust explosions which could be used where grinding machinery was operated.

The fact that inert gas would extinguish fires directed attention to the possibility of using it to prevent fires and resulting explosions. The experimental work described in this bulletin was undertaken to show that it is practicable to use inert gas to prevent dust explosions in feed-grinding equipment.

During 1913 and 1914, engineers in the United States Bureau of Mines and the Bureau of Chemistry of the United States Department of Agriculture investigated the use of inert gas as a means of preventing dust explosions in grain-handling plants and designed an inclosed system for grinding and conveying grain in an atmosphere containing sufficient carbon dioxide and other inert gases to prevent explosions (*11*).[2] From the records now available it appears that inert gas had been used in at least one industrial plant in this country before 1913. In this plant carbon dioxide was employed to render inert the atmosphere in which sulphur was ground. This equipment was probably in operation as early as 1909, but at that time it was considered a trade secret, and no information concerning it was published. Late in 1914, while studying methods of using inert gas to prevent explosions, an engineer of the Bureau of Chemistry inspected the equipment in this plant and found it operating satisfactorily.

Laboratory experiments had been conducted in the Bureau of Chemistry to determine the conditions necessary to prevent explosions of grain dust of various types. These experi-

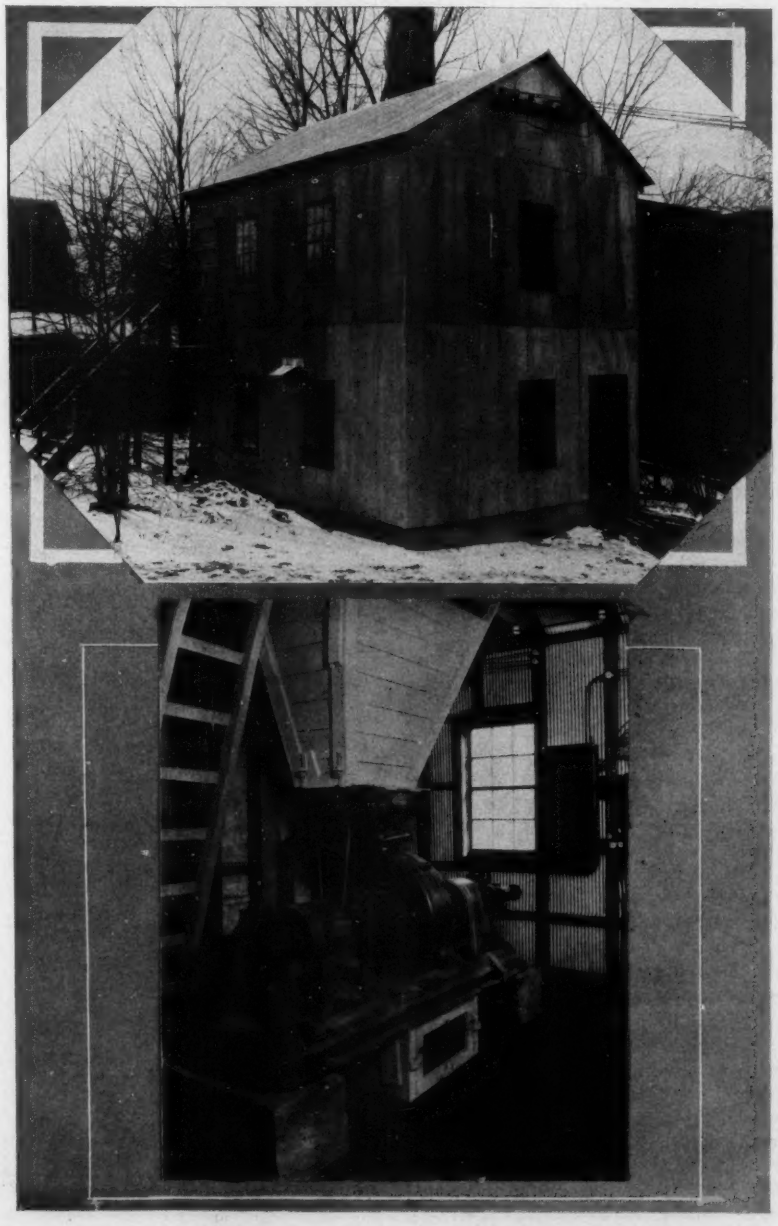


FIG. 3.—*Interior View Showing Some of the Equipment Used in the Experiments with Inert Gas as a Means of Preventing Dust Explosions During Feed Grinding. Fig. 2—Cut of Building.*

[1] A. C. Gerlach, formerly of the Bureau of Chemistry, was responsible for much of the preliminary work of selecting and obtaining suitable equipment for the plant. R. M. Baker, of the chemical engineering division of the Bureau of Chemistry and Soils, designed the building for the experimental plant and assisted in the installation of equipment and also in giving many of the demonstrations. P. W. Edwards and R. W. Harrison, of the chemical engineering division, made analysis of gas samples to check the results obtained with the Orsat apparatus at the experimental plant. W. C. Beckner erected much of the equipment and attended to the mechanical operation and care of the plant during the period of the tests. The attrition mill was lent by Sprout Waldron & Co., Muncy, Pa. Oat hulls used in the tests were furnished by the Quaker Oats Co., Chicago, Ill.

[2] Italic figures in parenthesis refer to Bibliography. See end of article.

ments (*3*) showed that grain dust would not explode in an atmosphere containing 12 per cent of oxygen, or less, provided the remainder was inert gas. For some grain dusts a higher percentage of oxygen could be used without danger of an explosion, but 12 per cent was recommended.

In order to check the laboratory results, large-scale tests were made at a plant where full-sized factory equipment could be used. A reel, screw conveyors, bucket elevator, and storage bin were arranged so that they could be closed tight and carbon dioxide could be admitted while the product was circulating. Cornstarch or dextrine circulated in this system did not explode when the atmosphere contained less than 14 per cent of oxygen and the remainder was inert gas (*12*). In view of the fact that the laboratory conditions might sometime exist in the plant, it was considered advisable to continue to recommend an atmosphere containing 12 per cent oxygen as the safe atmosphere in which to grind all grain products.

Later laboratory work with sulphur and hard rubber, reported by Frevert (*5*), showed that it was necessary to reduce the oxygen content of the atmosphere to 8.5 per cent, with the remainder consisting of inert gas, in order to prevent explosions of sulphur; an atmosphere containing 13 per cent oxygen and the remainder inert gas prevented explosions of hard-rubber dust.

As a result of the early experiments and recommendations several industrial plants installed inert-gas systems. They were principally hard-rubber grinding factories and sulphur-grinding mills. None was installed in grain-handling plants.

IN CONSIDERING the use of inert gas to prevent explosions in feed-grinding equipment, it was found that few data were available on the quantity and quality of inert gas necessary, and methods of introducing the gas into the feed-grinding equipment. Accordingly, experiments to obtain these essential data were planned.

Before the proposed investigations were begun, however, an effort was made to obtain all information on the uses of inert gas which might in any way have a bearing on the experiments to be conducted. Demonstrations of inert gas extinguishing cotton fires were witnessed, and the plans of other engineers for the use of inert gas in dust-explosion prevention were considered. Data were obtained from companies who were using inert gas in solvent-recovery work, and equipment employed for this purpose was inspected. Methods employed for obtaining and handling the inert gas were studied, and information was obtained concerning changes which had been made either because they were necessary or because it was thought they would improve operating conditions. Conferences were held with a number of

persons interested in the use of inert gas, including officials of sulphur companies employing this method of preventing explosions during sulphur grinding and officials of a company that manufactures sulphur-grinding equipment in which provision is made for the introduction of inert gas.

These preliminary studies indicated the need of experiments with factory-size equipment to check the laboratory results and to demonstrate the feasibility of using inert gas to prevent explosions during feed grinding. It was considered advisable, therefore, to erect an experimental feed-grinding plant, both to obtain information concerning the quality and quantity of inert gas necessary to prevent explosions and to demonstrate to feed manufacturers that, if properly used, inert gas would invariably prevent dust explosions.

The Experimental Plant

As it was desirable to have the testing plant near a boiler house in order to show the ease with which a supply of inert gas could be obtained from such a source, a site for the plant was selected close to the boiler house at the United States Department of Agriculture experiment farm, Rosslyn, Va.

The building (figs. 1 and 2) designed to house the machinery and material was a two-story structure of corrugated iron on a wooden framework. It was large enough to hold the grinding mill and other necessary equipment on the upper floor, and had space for motors, drive shaft, and elevator boot on the lower floor.

Figure 1 shows the general features of the building, as well as the location of the equipment. Figure 2 shows the completed building.

As most of the equipment in the experimental plant was standard, only a brief description of it is necessary.

A standard 24-inch double-runner attrition mill was used for both the tests and the demonstrations.

THE elevator selected was of the all-metal type having head, boot, and legs of galvanized sheet iron, reinforced with angle iron. The belt was of 6-inch woven cotton and had buckets about 16 inches apart. The elevator measured 18 feet from the center of the head shaft to the center of the boot shaft.

The blower was of the high-pressure type having a number of blades or paddles which slide in and out of slots in a central drum in order to follow the contour of the eccentric shell in which they and the central drum revolve.

A 25-horsepower 25-cycle, 220-volt induction motor, running at 750 revolutions per minute, operated the mill and the elevator. A 3-horsepower 220-volt alternating-current motor drove the blower. It ran at 1,400 revolutions per minute, but pulleys of different sizes reduced the speed to that required to operate the blower about 250 revolutions per minute.

The meter in the milling system was of the dry type similar to that used in households and had a capacity of 165 cubic feet per hour.

To carry the gas from the boiler to the mill, pipe most readily available was used. Five-inch iron pipe was used for the main supply line, which was laid directly on the ground from the boiler house to the experimental plant. A much smaller pipe would have served as well. Inside the experimental plant, 3-inch and 1½-inch iron pipes distributed the gas to the various injection points. Standard globe valves controlled the flow of gas in the various pipe lines.

The equipment for the electric arc consisted of one fixed and one movable carbon holder, made up of pipe fittings, and a rheostat to regulate the current producing the arc.

At first the gas in the milling system was drawn from the breeching between the chimney and a battery of four horizontal tubular boilers which supplied low-pressure steam for heating the buildings and greenhouses on the farm. Later a change was made, and gas was drawn from a small vertical tubular boiler in one corner of the boiler house. This boiler, which produced low-pressure steam, was fired throughout the year, and offered a more dependable supply of gas, since the others were fired or shut down according to the heating requirements.

The blower and the motor to drive it were placed on concrete bases close to the boiler house, and inclosed with sheet metal to protect them from the weather. A pipe connection was made between the blower and the boiler breeching, and a pipe line was laid from the blower to the building. The attrition mill was placed on the upper floor of the building, and the bucket elevator was assembled and erected.

Metal-lined wooden hoppers were constructed above and below the mill to store material to be ground and to collect the feed. Provision was made to circulate and regrind the feed by having the bucket elevator, which received the stock below the mill, elevate and discharge it into the hopper above the mill.

The motor which was to operate the mill was put in the lower story of the building and belted to a jack shaft directly below the attrition mill. An extra pulley on the jack shaft was belted to another small shaft, from which the bucket elevator was driven.

Various points on the attrition mill, elevator, and hoppers were connected with the main supply pipe which brought the inert gas from the boiler house. Valves were placed on all lines in order to regulate the quantity of gas going to any point.

Carbon holders and the necessary equipment for an electric arc to ignite the dust cloud were provided directly below the attrition mill, and a window was placed in the front of the compartment so that the operation of the arc could be observed. The starting boxes and switches for the main motor, the motor operating the blower at the boiler house, and the electric arc were placed on the main floor of the building, where they would be readily accessible. Figure 3 shows the arrangement of this equipment.

A metal-lined wooden spout, or duct, was constructed from the hopper under the mill to the outside of the building to provide for the venting of pressure should an explosion occur within the system. A wooden frame, covered with heavy paper, was fitted into the vent opening where the duct entered the hopper below the mill, to form a seal and retain the inert gas within the system as well as to prevent the escape of dust from the hopper into the duct. The outer end of the duct was covered with a metal flap, to keep out rain and snow.

When all the equipment had been set up and connected, several test runs were made for the purpose of determining how efficiently all parts were operating. As a result of these test runs several changes in the equipment were found necessary.

Since too much gas was being forced into the milling system a by-pass around the blower was provided. Valves in the by-pass permitted the flow of only the required quantity of gas. A waste pipe having a valve that could be operated from within the building was connected with the main supply pipe where it entered the mill building. With the valve at the blower set to deliver the desired quantity of gas it was possible to use the valve on the waste pipe to increase or decrease slightly the quantity entering the mill, and in this way to regulate the percentage of inert gas in the system. A gas meter was put in the pipe line running to the attrition mill to provide means of determining the quantity of flue gas admitted, and taps from which samples could be drawn were inserted at various points in order that gas in any part of the system might be analyzed. The diagrammatic sketch (fig. 4) shows the general arrangement of the equipment in the plant.

Sampling and Analyzing the Gas

IT WAS considered especially important in conducting these tests to secure a uniform distribution of gas throughout the system, since it might prove disastrous to start an explosion in an atmosphere just capable of supporting combustion and have the small flash propagate into an area or pocket where the percentage of inert gas was lower, thus producing a higher pressure than was expected. Accordingly, provision was made for collecting samples at a number of

(Continued on Page 25)

Fig. 1

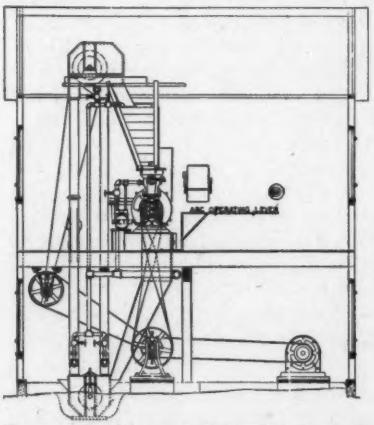
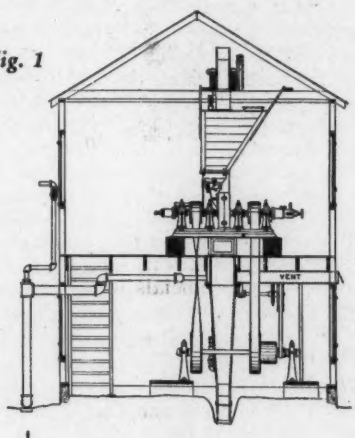


FIG. 1.—*Experimental Mill Using Inert Gas for the Prevention of Dust Explosions*



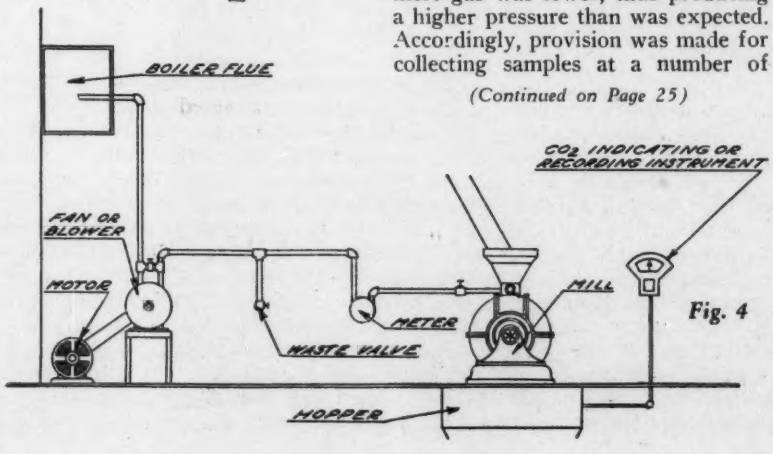


Fig. 4

FIG. 4.—*Diagrammatic Layout of Equipment Used to Provide Inert Gas for Feed Mill*

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The Value of Training in Insurance

IN THESE days the man who knows is the man who leads. And the man who knows is the man to whom the process of education is continuous with the process of living. The notion that a college diploma is the educational terminal; that after it has been achieved and framed and hung upon the wall, there is nothing more to learn, works badly in experience.

And this is also true of the notion that a certain native shrewdness, a cock-sure aggressiveness, a go-getting confidence, nerve and a good front are sufficient substitutes for knowledge. In a short dash they may prove effective. In the steady pace of the business marathon they soon lose their worth. The man who has nothing more finds himself dropping behind.

The Journal of American Insurance believes in placing the emphasis upon the exercise of trained intelligence in the field it represents. From the beginning it adopted the policy of treating insurance as a domain of enterprise deserving the best thought that the alert, modern mind can bring to it. With the deepest respect for its honorable traditions, its background of accomplishment adorned by illustrious names, the Journal has sought to hold it abreast of all that is worth while in the progress of research, in the growth of science and the development of better business practise.

Without violating the reasonable requirements of a proper modesty the Journal can claim justly that it has been foremost among periodicals devoted to insurance in the utilization of those sources of knowledge which are to be found in the universities and colleges, as well as in the sphere of actual experience. In a scientific age; in an age which by its rapid extension of man's realm of activity multiplies the risks to which he is subjected, the student of insurance cannot afford to rest upon the wisdom of the past. He must know the new world which is evolving so swiftly, and to the needs of which insurance must be applied intelligently. Increasingly come new demands and new opportunities. The man whose mental equipment has not kept pace with this expansion must travel bewilderedly in circles, never getting ahead.

The risks of marine disaster, of loss by fire on land —these were the beginning incentives to seek a method by which foresight could provide protection. But how vastly the field has widened! The risks of transportation by train, by private car, by public motor-bus and taxi; the perils of storm, lightning and tornado, to buildings; the danger of loss to crops thru adverse weather; and now the accidents of the air—thus incompletely we may indicate how the horizon which bounds the domain of insurance has been pushed farther and farther back. And everywhere there has arisen occasion for survey and research, for penetrating inquiry and thoughtful study. Statistics, statistics, and more statistics—they must be checked, compared, analyzed, interpreted.

IN THE universities and colleges are minds capable of doing this work, and they are doing it. In the field of insurance practise there are men, who, lacking the time and the facilities for such thoro study, yet must know the results of it, must understand the relation of those results to the specific needs for which they are writing insurance. Out of such knowledge grows improvement in method, new and more effective applications of fundamental principles. It is for this reason that the Journal has called upon the experts and specialists to make known thru these columns in authoritative articles what they are learning from their investigations. The Journal is a text-book, revised up to the moment, in what is best worth knowing concerning insurance.

And it is for this reason that the Journal always stresses the great value and importance of such conventions as the current one in Milwaukee. We regard this convention as virtually offering those who attend a university short course in insurance, and it is in that spirit, with that appreciation of its opportunities we congratulate those who can be present. The ablest minds in the field of insurance theory and office practise are on the program—men from the the universities and men who are leaders in the administration of the most successful mutual insurance companies. They come prepared, not primarily to entertain, but to inform. This is not a convention for self-adulation and back-slapping, but for illumination and instruction. It is a place to take your problems, and your notebooks.

In no other way can a man come so readily, and so intensively, in touch with the best there is to know about his work. Set the expense down to education with the assurance that every dollar invested in broadening your outlook, deepening your understanding, perfecting your method will bring its certain dividend.

We believe two things are true of the effective insurance man—he is well informed and he is enthusiastic. And the two things go together. There is no persisting enthusiasm without continuous information. Enthusiasm is the fine flower of faith, and faith must have roots in knowledge of facts.

The Journal of American Insurance will have new interest for you against the background of Milwaukee. It will carry on thru the year the educational work which is concentrated in the convention, and you will read with better insight and understanding, the rich and varied program of expert contributions which its pages carry.

Life Lights Against a Business Background

Circumstances

By S. J. DUNCAN-CLARK

I HAPPENED to be in a wise man's office the other day when he had occasion to talk to one of his young subordinates. In the concern over which he presides he is known—behind his back—as "the old man." His white hair has earned him that title, and, truth to tell, his years are not far from three score and ten on one or other side. But, tho he may have the wisdom of age, of a long experience and more real thinking than most of us are inclined to do in this era of hurry, he retains much of the vigor of a youth which was dynamic with energy and enterprise.

Hence none of those who know him have any thought of deprecation when they call him "the old man." It is, rather, an expression of respect, even of affection. They might call him "the sage" if the title were not so archaic. There are men of fifty in the organization who were young men, just entering upon their business careers, when he became general manager. When any two of them get together and talk about him they have much to say of how he helped them by his reproof, rebuke and exhortation in their beginning days. He trained them for the business, and incidentally threw in a generous measure of guidance for life. He is still doing it with the youngsters who must be recruited from time to time to fill the gaps, or increase the strength of an industry which has grown steadily.

It was one of these youngsters who stood at his desk in response to the push of a button. He was reporting on a task to which he had been assigned. It had been a difficult task, and he had little success to report. He kept referring to the "circumstances" which had been unfavorable, or opposed to him. It was apparent he was trying to excuse himself.

The old man listened without interrupting, save for a pertinent question or two. He was looking out of the window as he listened. In front of the office building, where he occupied a spacious room on the sixth floor, stretched a broad highway and beyond it the river. There was traffic on the river. Tug boats, big freighters, dredges passed up and down in leisurely fashion.

The youngster finished his report, and awaited anxiously the word of the old man. There was a moment's silence.

"So it was circumstances," he said. "The circumstances got in your way. That was it."

"Yes sir, exactly," replied the youngster, his voice denoting relief that his explanation of failure had been accepted, apparently.

"Come here, boy," said the old man. "Do you see that strange craft in the river?" My eyes followed those of the two men. A long, flat vessel, with three huge derricks rising from its deck, was passing slowly.

"Can you read what is on those canvas signs it carries?" he asked.

"Yes sir. They say 'River Straightening Plant.'" There was a respectful wonderment in the answer. What was the old man after? This seeming change in the topic of conversation had an ominous suggestion to it. Or was he actually dropping the subject and its possible embarrassments?

"When I began work in the old building that used to stand on this site forty years ago that river ran in the opposite direction to which it is now running," said the old man. "Then there came a day when enterprising men decided that it would be to the advantage of the city and its tributary region if the river should flow the other way. There were certain things they wanted to do which could be done only if the course of the river were reversed. So they set to work and actually changed the river's flow. Now, at this point, where it used to go east, it is going west. But you are familiar with that story, I have no doubt."

"I have heard about it, sir," replied the youngster, whose face showed increasing mystification.

"Of course. And, doubtless, you know that there is a kink in the river after it turns south which for long has obstructed the development of the city. It blocks traffic; it forces detours; it occasions loss of time, and discounts the value of adjoining space. Very well; men in this city who do things have decided that the kink must be taken out of the river. It must be straightened, so that the city's life may move freely. That strange craft—there are flags flying on it, quite properly—represents the beginning of the work to make the river straight. It will be a good thing for the city, don't you think?"

"Yes sir, I am sure it will. I live on the southwest side, and that kink is an obstruction I have often noticed," answered the youngster.

"Did it occur to you that it might be removed?" inquired the old man.

"No sir, not until I read in the newspapers about it."

"Listen boy," the quiet voice went on, "obstructions have a value. They are designed to test the ingenuity and enterprise of man in removing them. If the river does not run the way we want it, we must make it run that way. If it interposes kinks that block and delay us, we must straighten out the kinks. Circumstances—that is what you said caused your failure on this particular job—circumstances, adverse circumstances. Boy, I gave you that job to find out what you would do with circumstances. I was more concerned to discover what was in you than I was about the job itself. If you had overcome those circumstances you would be a better man today, and a more valuable man to me. Your biggest failure is not my loss, but your own. It is what you have failed to make of yourself out of the challenge of those circumstances which is the most important thing."

The youngster's face flushed and his eyes fell.

"I am sorry, sir. Do you want my resignation?"

"No!" The answer came almost sharply. "I want your resolution, not your resignation." Then the voice continued in its quiet tone, "Have you ever thought about the derivation of that word 'circumstances'?"

"No sir, I can't say I have. I suppose literally it would mean 'things that stand around,'" answered the boy, as his mind went back to his college Latin.

"Precisely. Things that stand around, and get in your way, eh? Well, it is up to you to make them move. Make the things that stand around march; make 'em march the way you are going. Do you get my meaning?"

"Yes sir, I think so. Thank you. I will try."

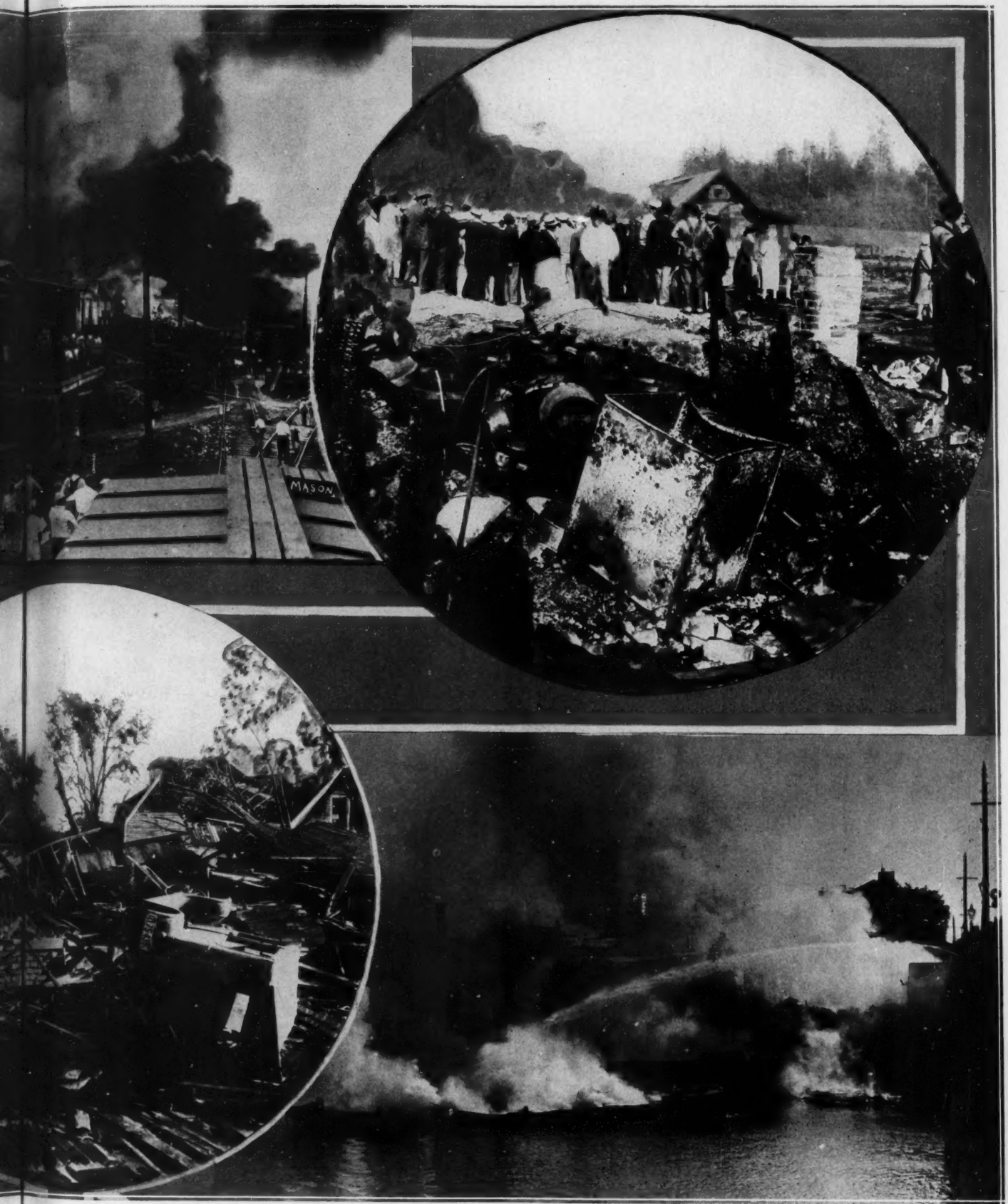
"Good! You are reassigned to the job with the circumstances," said the old man.

***Spectacular Destruction** (Left at Top) **Is Strewn Along the Tracks** When Vigilance Is Relaxed Even for an Instant. Damage in Such a Wreck as This Reaches Into Surprising Thousands.*

***New York's Subway Disaster** (Left at Bottom) Brought New Problems to Police and Other Authorities in the Handling of Difficulties Underground.*

PROPERTY NEEDS MU

***Fire at Work in a Vast Lumber Yard** (Center at Top) Where the Flames Persisted for Many Days.*



MUTUAL PROTECTION

Illicit Stills Are Making Double Trouble *(Right at Top) This One Ripped Up an Entire Community and Left Many Bereft of Their Homes Within a Few Seconds.*

All That Remained of a Garage *(Center at Bottom) In Minnesota After an August Tornado Demolished a Small Town.*

Two Barges Ablaze on the Thames River *(Right at Bottom) At Kingston, England. Eight Other Barges Were Burned at the Same Time.*

Lumbermens Mutual Casualty Company Has New Building

Where the Lumbermens Mutual Casualty Company Will Move on November 1st

THE Lumbermens Mutual Casualty Company has closed a long term lease on extensive space in the eight-story building at the southwest corner of Sheridan Road and Lawrence Avenue, Chicago, and with associate companies all under the management of James S. Kemper will on November 1 occupy to begin with the top three floors comprising over 50,000 square feet. The building will be known as the Mutual Insurance Building. This is the largest building in Uptown Chicago and one of the largest and finest office buildings north of the river. Chicago downtown branch offices of Kemper Insurance in the Federal Reserve Bank Building and in the Builders Building will be maintained as at present.

The new location is two blocks north of the offices from 4600 to 4642 Sheridan Road occupied by Kemper Insurance since its removal from the Loop to the Uptown Chicago district in 1920. The Kemper fleet of insurance companies was one of the first large business institutions in Chicago to locate on the far north side near the residences of its employees. Over half of the Kemper Insurance staff now numbering 350 employees live within two miles of the new offices.

PREVIOUSLY space had been occupied successively in the McCormick, Insurance Exchange and Lumber Exchange (now Roanoke) Buildings. It was to the first named building that Mr. Kemper, then in his early twenties, came in 1910 from his home town, Van Wert, Ohio, to open an office for the Central Manufacturers' Mutual Insurance Company of that city and Associated Lumber Mutuals. Five hundred square feet of office space were then sufficient for the organization which will now occupy one hundred times that amount of space.

Mr. Kemper is President and General Manager of the Lumbermens Mutual Casualty Company, National Retailers Mutual Insurance Company, American Motorists Insurance Company and Federal Mutual Liability Insurance Company, is manager of the Building Owners Federation of Mutual Fire Insurance Companies and of the Western Department of the Central Manufacturers' Mutual Insurance Company, the Associated Lumber (Fire) Mutuals and the Improved Risk Mutuals. He is manager of the Insurance Department, Lumbermens Association of Chicago, National Association of Building Owners and Managers and National Shoe Retailers Association. He also acts as insurance consultant and advisor to a large number of lumber and other trade organizations throughout the country. Mr. Kemper recently retired from the directorate of the Chamber of Commerce of the United States after eight years of service.

The business of the Kemper Insurance office for the current year will it is expected exceed sixteen million dollars. The Kemper office manages or represents more than fifty insurance companies, with total admitted assets of over sixty-three million dollars including net cash surplus of twenty-six million dollars. These companies have insurance in force exceeding four billion dollars. Their losses paid to date total over one hundred and ninety-three million dollars and their savings to policyholders have been over one hundred and forty-two million dollars. Kemper Insurance is a nationally known institution besides being a leading insurance organization in its home city and state. Branch offices are maintained in Albany, Atlanta, Baltimore, Boston, Buffalo, Chattanooga, Columbus, Detroit, Kansas City, Los Angeles, Milwaukee, Minneapolis, Newark, New York, Omaha, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Syracuse and Toronto, Canada.

THE Lumbermens Mutual Casualty Company of which Mr. Kemper has been the manager since its organization in 1912 is the principal casualty insurance and bond carrier of the organization. It is the largest writer of mutual automobile insurance in the United States. The company has paid for losses and returned to policyholders in dividends since organization over twenty million dollars.

The Federal Mutual Liability Insurance Company is one of the older of the mutual casualty companies, having been organized in 1905. It is the latest addition to Kemper Insurance, having become affiliated in the early part of the present year. The affiliation of the Federal emphasized the need for additional accommodations for the growth of Kemper Insurance.

The new space is being especially laid out and equipped to accommodate the complete service for every line of insurance maintained by the Kemper organization for its 150,000 clients. There will be elaborate clinical facilities for the medical department and for the welfare of employees, as well as particular provisions for underwriting, engineering, safety, legal and other specialized departments.

Bill: "What is the hardest thing you ever did?"

Will: "Make ten easy payments."

Marshall: "Yes, this is the Fire Department. Do you want to report a fire?"

New Bride: "Oh, no I just want to order coal and wood for the winter."

Proud Parent (who served): "What I told you is the story of the World War."

His Son: "But, papa what did they need the rest of the army for?"

Hazards of the Oxy-Acetylene Torch

Growing Danger of Using this Popular Tool Without Proper Safeguards to Prevent Fire and Explosion

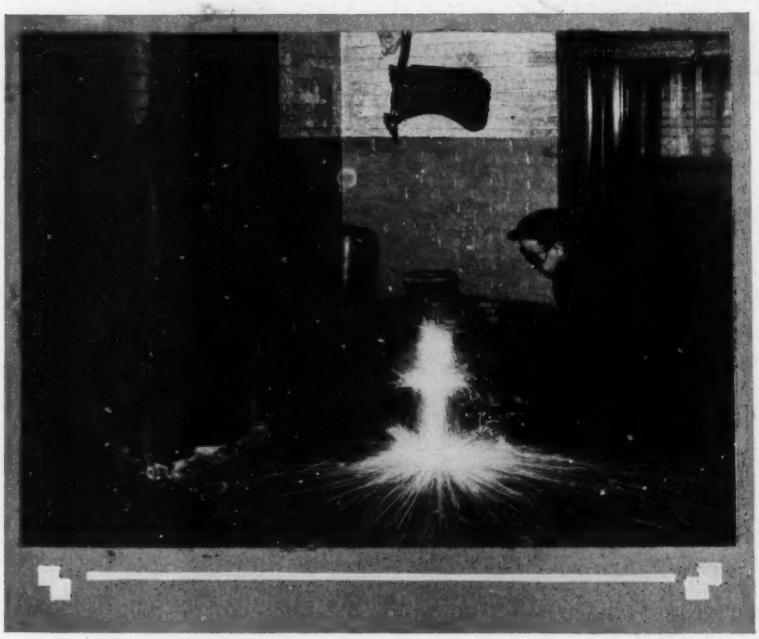
Reprinted From the Factory Mutual Record Boston, Mass.

TODAY the oxy-acetylene torch does the work which yesterday was done by the hack saw, cold chisel, and drill. To replace these old "strong-arm" methods, modern science has produced a convenient, high-temperature flame which does the work more quickly, more cheaply, and more effectively. Manufacturers compelled to meet the high labor costs have not been slow to adopt the new method.

The portable oxy-acetylene outfit has many uses in an industrial plant for both welding and cutting. Maintenance departments and builders require it for the installation, repair, and alteration of piping, trusses, beams, and machinery. The increasing use of steel in modern construction, either as structural shapes or reinforcing rods for concrete, demands a ready means for making alterations and repairs.

Although there is little risk of fire when oxy-acetlyene torches are used in permanent locations properly safeguarded, their general and sometimes careless use for repair or installation work throughout industrial plants has introduced a new and serious fire cause. An alarming increase in such fires has occurred in Factory Mutual plants in the last two years, as shown by the accompanying graph. Thirty-six losses in 1927 totaled more than $80,000, and already in the first three months of 1928 thirteen losses have been reported. These are the more serious fires only, and do not include many small ones which resulted in little or no loss and were not reported.

A recent fire at a paper mill illustrates the hazard. Workmen were using an acetylene torch to cut a doorway into the corrugated-iron siding of a storehouse piled high with bleached pulp wrapped in burlap. They took precautions — stationed men with extinguishers on the pile and covered the near side with an asbestos curtain—but a spark rolled under the curtain, ignited the burlap, smoldered unseen, and s u d d e n l y flashed so quickly over the pile that the men barely had time to get out safely. Other workmen, not knowing that the hazardous cutting work was going on, had disconnected the sprinkler piping to make an extension into a new section. Before the men could reconnect the sprinklers, or before the quickly summoned fire brigade could lay hose lines, fire had burrowed so deeply into the pile that a loss of nearly $60,000 resulted.



Courtesy Factory Mutual Record

Sparks From an Acetylene Cutting Torch Are Really Globules of Molten Metal. They Fall in a Shower, Graphically Recorded Here by a Few Seconds' Exposure of the Camera

A much more serious fire occurred last September at another paper mill (not insured in the Factory Mutuals). The old machine-room roof was being replaced. Workmen were using an acetylene cutting outfit on a platform laid on the bottom chords of the trusses. The hose broke and the escaping gas ignited with a flash. The fire fused the safety plugs in both the acetylene and oxygen cylinders, releasing additional gas, which burned intensely. The men scrambled through a hole in the roof only just in time. Two hundred and sixteen sprinklers opened, but the water had been shut off during repairs. The master mechanic opened the valve and started the fire pump with little delay; but already the intense initial fire had heated the trusses so that twelve of them soon collapsed, dropping the roof upon two large Fourdrinier machines. Actual fire damage plus interrupted production brought the estimated loss to $220,000.

On March 1, a millwright in an automobile plant was given orders to repair a chute during the noon hour. He used an acetylene torch, seven feet away from a dip tank containing two thousand gallons of enamel. The foreman of the dipping department came along, recognized the danger, and immediately ordered the work stopped. Just as he spoke, there was a flash of fire from the enamel, ignited by a spark from the torch. The dipping enclosure, unsprinklered and non-combustible, was soon a mass of flame. The foreman at once tripped the automatic foam extinguishers by hand. This quickly covered the dip tank and drip board with a layer of foam and extinguished the fire there, but enamel residue on the floor, conveyor, and freshly dipped chassis frames continued to burn fiercely. Private and public fire departments were on the scene in a few minutes. They used several large foam and soda-acid engines, a number of hand extinguishers, and two hose streams. Their prompt action put out the fire

in twenty minutes, and kept the loss between $1000 and $1500.

Another fire, strikingly similar, occurred on March 9 at another plant. A new automatic japan flow-coating process and baking oven were nearing completion and had been running at forty per cent capacity for about a week. The oven fan was in operation, but the ventilating fan and parts of the enclosure at the flow-coating end had not yet been installed. Without these safeguards, it was unwise from the safety standpoint to operate the process. Lack of ventilation soon permitted an explosive mixture of thinner vapors and air to form. Under the conditions, it was further decidedly unwise for workmen to use an acetylene torch to cut holes in a steel column just outside the enclosure; but they did, and sparks from the torch ignited the mixture and caused a sudden explosion which blew out about fifty feet of steel sash windows. One employee ran to shut down the japan circulating pump while others brought three 40-gallon foam engines into the enclosure and extinguished the fire, now burning intensely in the japan deposits. Here again quick and intelligent action prevented what might easily have been a very serious fire and kept the loss down to about $1500.

These fires all show the need of care and vigilance in using the portable oxy-acetylene outfits. One danger, that of ignition of gas from burst hose or leaking valves and fittings, can be easily eliminated by proper care of the apparatus and by replacement of hose as soon as it shows signs of wear.

By far the greatest danger is from sparks flying from the cutting torches. These sparks are really small globules of molten metal, thrown out in a heavy shower and sometimes for a considerable distance. They easily ignite any light combustible material with which they come in contact. They have also started smoldering fires which later burst into flame.

Safety, therefore, requires that these torches should not be used near combustible material unless absolutely necessary. Movable work should be taken to a safe location in a sprinklered or non-combustible building or to a detached smithy. Sometimes it is possible to move exposed material a safe distance away, say twenty feet. Metal shields can further be used to confine the sparks. Men with water pails or hand extinguishers should also be on alert guard nearby to see that any possible

fire which starts is promptly extinguished.

Full sprinkler protection should be maintained whenever cutting torches are being used in a building of combustible construction or occupancy. During extensive repairs or building changes, it is sometimes necessary to shut off the sprinklers. Such lack of protection is a dangerous condition in itself and needs special precautions. The use at such time of an equipment likely to start fire further increases the danger and is decidedly unwise.

The remedy is to plan the work so that acetylene cutting and sprinkler repairs are done at different times. If

this is not possible, hose lines should be laid and particular care taken to guard against the sparks.

A fire hazard once recognized is a battle half won. Care and vigilance will eliminate the growing hazard. The necessary precautions are few and simple, but very important.

Do not use acetylene apparatus where an open flame of any kind would be dangerous, as in rooms containing flammable vapors or liquids, lint, dust, or any loose combustible stock.

Watch the sparks. See that they do not come in contact with combustible material, do not lodge in floor cracks, and do not drop through holes to the floor below. Use sheet-metal guards or asbestos curtains where needed.

Station extra men with chemical extinguishers or fire pails nearby when torches must be used near combustible material.

Maintain sprinkler protection without interruption while acetylene torches are being used. Fire spreads rapidly in unprotected combustible construction, regardless of the cause.

Keep the equipment in good order. Use good hose and renew or repair it when necessary. Modern, well-maintained apparatus should give little trouble.

Mount the cylinders on a truck so arranged that fragile parts are well guarded. Remove the apparatus at night.

Store extra cylinders outside important areas.

Rocky Job

Boss—"Rastus, you good-for-nothing scamp, where have you been loafing all day? Didn't I tell you to lay in some coal?"

Rastus—"Yassu. Ah's been layin' in de coal all day, tho dere is lots of softer places whar Ah'd ruther lay."—*Boys' Life.*

Hush-a-by, baby, safe in your cot,
Daddy's come home and his temper is hot;
Cuddle down closer, baby of mine,
Daddy went round in a hundred and nine.
—*Boston Transcript.*

No Complaint

"Young man," called down the girl's father sternly from the top of the stairs, "have you any idea what time it is?"

"Twelve o'clock, sir," replied the exgob.

"Well?"

"And all's well."—*Ex.*

Arabian Nights

Husband (arriving home late): "Can't you guess where I've been."

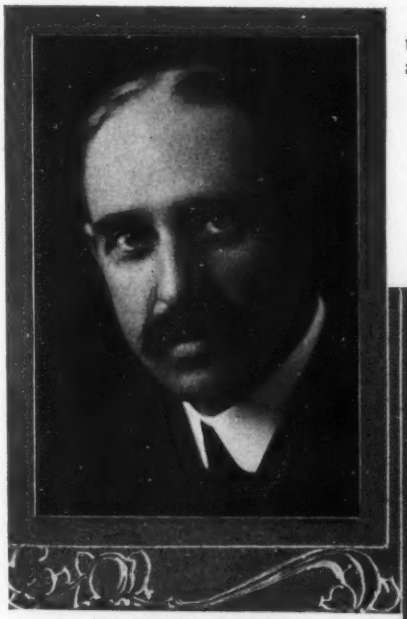
Wife: "I can; but tell your story."—*Answers.*

Inscription on a tombstone: Here lies an atheist, all dressed up and no place to go.

Millers Mutual of Texas Celebrates

Thirtieth Year of Successful Operation Brings Congratulations All Around for Company Noted for Energy and High Ideals

AMONG the Mutual companies having featured anniversaries this year, the Millers Mutual of Fort Worth, Texas has an exceptionally interesting history. Thirty years ago in July this organization began business and through the ups and downs of pioneering a difficult field it has steadily progressed until today it stands as a conspicuous example of the success which energy, integrity, intelligent management and business foresight can achieve.



GLEN WALKER
Vice-President and Treasurer

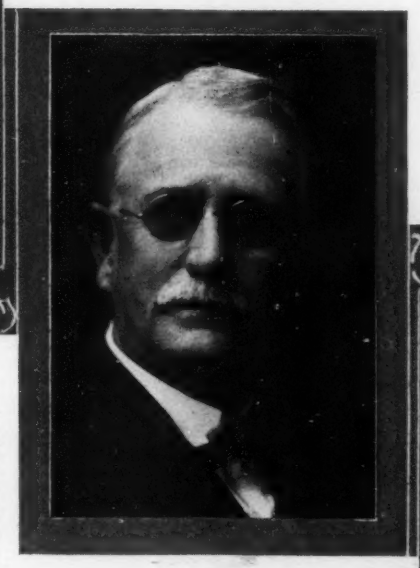
Comparison should not be made with the older Mutuals of the East and North without considering that Texas was not only a youngster, but that its population at the time The Texas Millers was incorporated was less than three million scattered over 265,896 square miles, length north to south—740 miles, breadth east to west—825 miles. Fort Worth's population in that period was less than 25,000. In addition, "Mutual Insurance" was new to this section.

In 1895 Mr. M. P. Bewley, one of Texas' foremost millers, suggested to Glen Walker the organization of a mutual fire insurance company and added that all the business that the "Mill Mutuals" would take he had thus placed to his considerable advantage. Mr. Walker, after spending several months investigating the success of Mutuals, obtained a charter for "The Millers Mutual Fire Insurance Company of Texas," he financing the organization with a guarantee from seven of the leading millers. On July 1, 1898 the first policies were issued.

Mr. Glen Walker, now Vice-President-Treasurer, and Mr. Ed. K. Collett, Secretary, were two of the charter incorporators and for its thirty years, the company has been under this same management.

The following were directors twenty-five years ago and are serving at the present time:

B. R. Neal, Dallas.
Frank Kell, Wichita Falls.
J. Perry Burrus, Dallas.
J. C. Whaley, Gainesville.
H. Dittlinger, New Braunfels.
Gustav Giesecke, San Antonio.
E. G. Rall, Fort Worth.
Glen Walker, Fort Worth.



R. R. NEAL, President

The Millers Mutual of Texas is not only the oldest fire insurance company in the Southwest but is the largest, and is licensed in twenty-eight states. Its office writes and cares for the business in Texas and part of Oklahoma for about twenty-five associate mutual companies. The office force has grown in numbers until now over fifty employees are necessary to attend to executive matters and routine detail.

For several years eight to ten men have cared for the inspection and field work. The late Mr. W. H. Ingalls who was well known to most of the Mill Mutual Group was with the company for twenty-five years as Chief Inspector. As an example of the thoroughness with which this department functions it may be mentioned that three of these inspectors average three thousand miles per month auto travel.

In 1921 The Millers Mutual erected a two-story office building one hundred by eighty feet in dimensions, at a cost of over one hundred thousand dollars, the land and building appearing in the Company's assets at a conservative value of $150,000. This building will permit of additional stories, as the Company grows, which indeed is guaranteed by its past record.

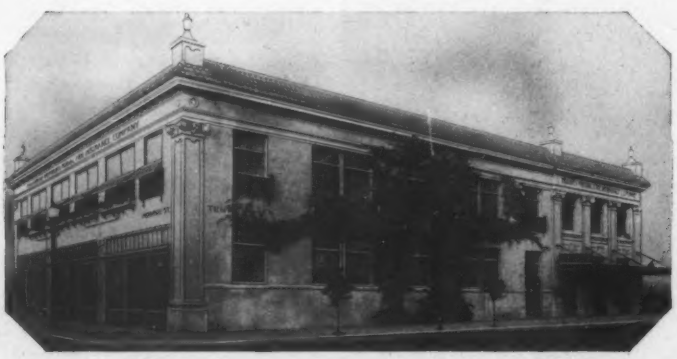
Aside from the material progress of the Company, the really gratifying results are the services rendered the insuring public in its immediate territory of Texas and Oklahoma, the furthering of the best ideals of Mutual Insurance, and the building of an organization respected by the general public, including its competitors, for its fair dealing, conservatism and good business practices.

ED. K. COLLETT
Secretary

The management has always put "mutuality" and the Golden Rule into practice, not alone in dealing with the public but daily in the Company office. It enjoys to an unusual degree the support and loyalty of the employees, many of whom, both men and women, have been with the company from ten to over twenty-five years.

While appreciating that the public usually selects the "Dividend" or unabsorbed premium returned as the greatest service, the management of The Texas Millers Mutual places Fire Prevention first, and has continuously and systematically kept this before the policyholders.

An Auditing Service was inaugurated several years ago, and now it is not unusual to receive an express package containing a hundred or more policies for auditing and having corrections, revision or improvement in coverage, made. This service, free to both policyholders and non-policyholders, is of mutual benefit. The number of policies audited for the year 1927 was over nine thousand.



The Company's growth has been consistent, the assets December 31, 1927 being just over the million mark, and the cash surplus $437,774. The losses paid since organization amount to $4,226,633 and saving or dividends returned policyholders, $3,225,840. The company is thirteenth in volume of premium written in Texas. Only twelve stock companies have a greater premium income.

Mr. Glen Walker has been a member of the Governing Board of the Federation of Mutual Fire Insurance Companies for many years and has always been intensely interested and a willing worker for the good of Mutual Insurance.

Fidelity and Surety Bonds

(Continued from Page 6)

particular line of business. Another matter that the underwriter would naturally inquire into is whether or not the contractor who wishes to be bonded has completed arrangements for securing all the materials necessary for carrying out the job and whether sub-contracts have been let. The underwriter also would not overlook the general business conditions which exist at the time when the bond is written as well as the forecast of business conditions, insofar as they can be forecasted, for the months or years during which the contract will be in progress. The contractor, of course, would be required to submit to the surety company with his application for contract bonds a satisfactory statement of his general financial conditions, which statement would be scrutinized carefully, particularly with respect to the quick value of practically everything that he lists among his assets.

ENOUGH has now been said, perhaps, to impress the fact that the business of fidelity and surety companies is broad in scope, that it is rather technical in character, and that it renders an almost indispensable service to modern business. It would be extremely difficult for modern business to function at many points without the service of corporate suretyships. The officials and underwriters of the surety companies that issue all types of corporate bonds are brought into business relationships with men in practically all walks of life. Corporate bonds cover innumerable business relationships of those who are living and, as we have seen, are required of administrators and executors when people die. Those in positions of trust—directors, manufacturers, lawyers, and others—need fidelity or surety bonds for the successful prosecution of certain aspects of their business. Not all who need such bonds secure them. It has been stated on authority that, in spite of the great growth of corporate suretyship in this country, private suretyship still covers a larger volume of business than that of the corporate organizations. With the advantages of corporate, over individual, suretyship rather generally recognized, there is still a vast field for further development here of the work of the surety companies.

In order to prevent fidelity and surety companies assuming too great a risk in any particular case, statutes have been passed in some jurisdictions placing the limit of coverage in any individual application at 10 per cent of the capital and surplus of the bonding company. The business affairs of most companies are administered so intelligently nowadays that such legislation seems hardly necessary for public protection. Although bonding differs in many important particulars from insurance,

(Continued on Page 28)

(Above) Home Office Miller's Mutual of Texas

(Below) Section of Main Office of the same Company

They Trebled American Profits

How Foreign Insurance Companies Fattened Their Bank Accounts By Simple Process Known to Only a Few

By RICHARD MORRIS

Fellow of the Royal Statistical Society
Former Member of Parliament

MAN must have a direct financial interest in the result of his own economy, if he is to continue to economize. If he is to continue his unrelenting vigil against waste by fire, in precisely the same way, he must secure the full economic benefits derivable from his own alertness and watchfulness. It is essential that the public of America and of England shall have a direct interest in the saving of fire waste.

Are there any means by which this desirable result can be achieved? Or must man, emancipated and intelligent, continue to be exploited by international financiers who, by cunning devices, deprive him of the benefits of his own prudence and discretion? The answer is a loud and resonant negative.

A plan was formulated generations ago by one of the World's master minds, giving man financial protection against loss incurred through fire and a direct interest in restraining this furious element. The designer had no statistics to guide him, nothing but his own vision of the truth, nothing but his own passion for the welfare of his beloved Philadelphia. But what was intended for the protection of one City has since become a bulwark for the whole.

MUTUAL Insurance as Franklin perceived it, preached it and practised it, is recognized today by all who are free to form an unbiased opinion, as the soundest and most equitable system for economic protection against disasters common to all. Then why does this system not sweep the land with greater speed? It may be that in the past mistakes were made in developing it, but the basic reason is that progress always travels in a slow coach. Never in an express train. The road is scattered with the strong barriers of vested interest and the vehicle must necessarily travel slowly. Simultaneously with the formation of the Philadelphia Contributionship, Franklin founded the Pennsylvania Society for the suppression of slavery. He was flouted and jeered at by the hirelings of slave owners, just as Mutual Insurance today is often harassed by men of small vision. It is over one-hundred-and-forty years since Franklin started his great work for the suppression of slavery. It was only last year that this disgraceful form of human bondage was completely discontinued within the British Empire. As night follows the day, so also will the principle of American insurance introduced by Franklin become the universal system.

Last year the English Fire Insurance Trust Companies operating in America trebled their fire underwriting profits on a premium income that was millions of dollars less than that for the preceding year. How did that happen? They tell us that it happened in two ways. Firstly, not because of the falling off in business but as the result of deliberate pruning of unsatisfactory risks. It is perfectly simple. When they get the fire rates fairly stabilized on a general basis, the poor with the good, they accept only the good. That is called clever management. But what happened to the poor risks? They had to remain uncovered or seek shelter in some American company.

If a few of them may possibly have found their way to a Mutual Office they thus became automatically better risks. This because they came under the discipline of closer supervision and because the insured has changed his environment, and now realizes that he is a partner in a common venture in which the burdens are really shared; in which there is an effective unity of effort to make the

Photo by U. & U.

Firemen of London, England, Demonstrate a New Extension Ladder

burden as light as possible. Man, in his heart, resents the notion that the stockholders should make an unduly large profit out of him simply because he is careful. His resentment grows as his knowledge of the machinery of insurance improves. What benefit is he going to derive by keeping a constant guard over a contingency for which he has paid the full price? He sees the bulging pockets of the stockholders. He sees the market price of their stocks in the Exchanges soaring high. He becomes surfeited with the altruistic professions of the stock companies. His self-respect, as well as his self-interest, has at last made him weary of this constant conflict between benevolent profession and contrary practice. If he has energy enough, if he has public spirit enough, let him break away from this imposition, and make his insurance home in a quarter that is free from doubt, and henceforth enjoy the full rights of mutual membership.

THE difference between the Fire Trust or Tariff Companies, and, say, that of the Boston Manufacturers Mutual in one important respect is vital and fundamental. The Trust Companies have told me that they are Fire Insurance Companies and not Fire Prevention Companies. Have they no interest in preventing fire waste below a certain level because they have to maintain their huge profits? Is it not to their interest to work for the elimination of fire waste? Must they have fires and must they have accidents, or their business would decline and their profits would dwindle to the vanishing point? Their perplexing problem is to maintain a profitable underwriting balance on an immense turnover. That balance will be seriously imperilled if there is too great an awakening of the public conscience regarding fire waste.

"We cannot finance activities which will enable the public to obtain lower premiums." That is their declared policy, a policy recently publicly exposed by a British Cabinet Minister of a Conservative Government which is supported by wealthy followers. But objection does not spring from socialistic dislike to wealth or capital or private enterprise, all of which are essential provided they are legitimately employed. It is the righteous anger of an honest man at a powerful institution which is pursuing a policy contrary to the public interest. But they must continue to pursue that anti-social policy because their basis is wrong. To build up an enormous system of insurance on the superstructure of large speculative profits is false to the insured and false to the nation. Insurance by its very nature, necessarily makes all its members joint beneficiaries of all its benefits. It is impossible to build a temple of common service on a money-hunting foundation. Insurance directors at conferences intended for the enlightenment of the public frequently use or paraphrase the noble words of the late Dr. Charlton Lewis of Harvard.

> "Insurance measures and promotes the growth of the spirit of community. It has done more than all gifts of impulsive charity to foster a sense of human brotherhood and of common interets. It is impossible to conceive of our civilization in its full vigor and progressive power without this principle, which in all its applications together unites the fundamental law of practical economy, that he best serves humanity who best serves himself, with the golden rule of religion, Bear ye one another's burden.'"

Insurance directors are entitled to say all this but they are not entitled to hide behind this fine sentiment while they vote added dividends to stockholders instead of making insurance less expensive to policyholders.

Turn away from these evident devices and ponder a moment over the work of, say, the Mutuals of New England. They are not living in a citadel of sham, nor do they make loud professions of the Christian basis of their work. They practice it and their constitution will not permit them to deviate from it either to the right or to the left.

The Hon. Edward Atkinson, the Grand Old Man of the preceding generation, declared that fire losses can be reduced to a minimum, and proved it. When he was chief administrator of the Boston Manufacturers Mutual, by a system of inspection and of instruction following inspection, he had reduced the fire losses of that Company to two cents per hundred dollars of risk. So keen was he on sprinklers that one disgruntled policyholder told him that when he passed away to another life he had better take a sprinkler with him for his own protection. Indeed, I believe he did that.

Every Mutual Manager pursues fire waste on the lines laid down by Edward Atkinson. That is his business according to the Charter under which he is working. To reduce fire waste to a minimum. Is that to the advantage of the members? Is it to the advantage of the public and of the nation? The saving of fire waste is as much the work of a Mutual office as it is to provide an indemnity for losses. They need no State department to supervise rates. These fix themselves on a basis approximating the *cost*.

The object of the Mutual Movement is to keep the institution of insurance clean, to maintain its efficiency for the prevention of waste, and for indemnification against loss. To get men to work together for the avoidance of calamities common to all, and to provide full compensation to any of their number who may unfortunately suffer loss. It is a Fellowship of common service to meet the economic needs of common disasters. It is not honorably possible to exploit it on the lines of joint stock ventures like Standard Oil or General Motors, which are legitimate commercial enterprises, and belong to a totally different category of human effort. Membership of this Fellowship is a token of public spirit, of personal integrity, and of a true sense of the common weal.

This is not some dreamlike utopianism. It is functioning today in the daily life of the people of nearly all countries, but in America on a more extensive scale than anywhere else which gives force to Abraham Lincoln's dictum regarding the impossibility of fooling all the people all the time. The consecrated mantle of Benjamin Franklin has fallen on strong successors to the lasting credit and advantage of the American people.

The second reason for the immensely bigger American profits of the English Trust Companies on a much smaller volume of business is the general all-round improvement in fire claims.

AS THE result of Mutual teaching and of Mutual example, the public is getting to realize more and more the wickedness of avoidable

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Inert Gas

(Continued from Page 13)

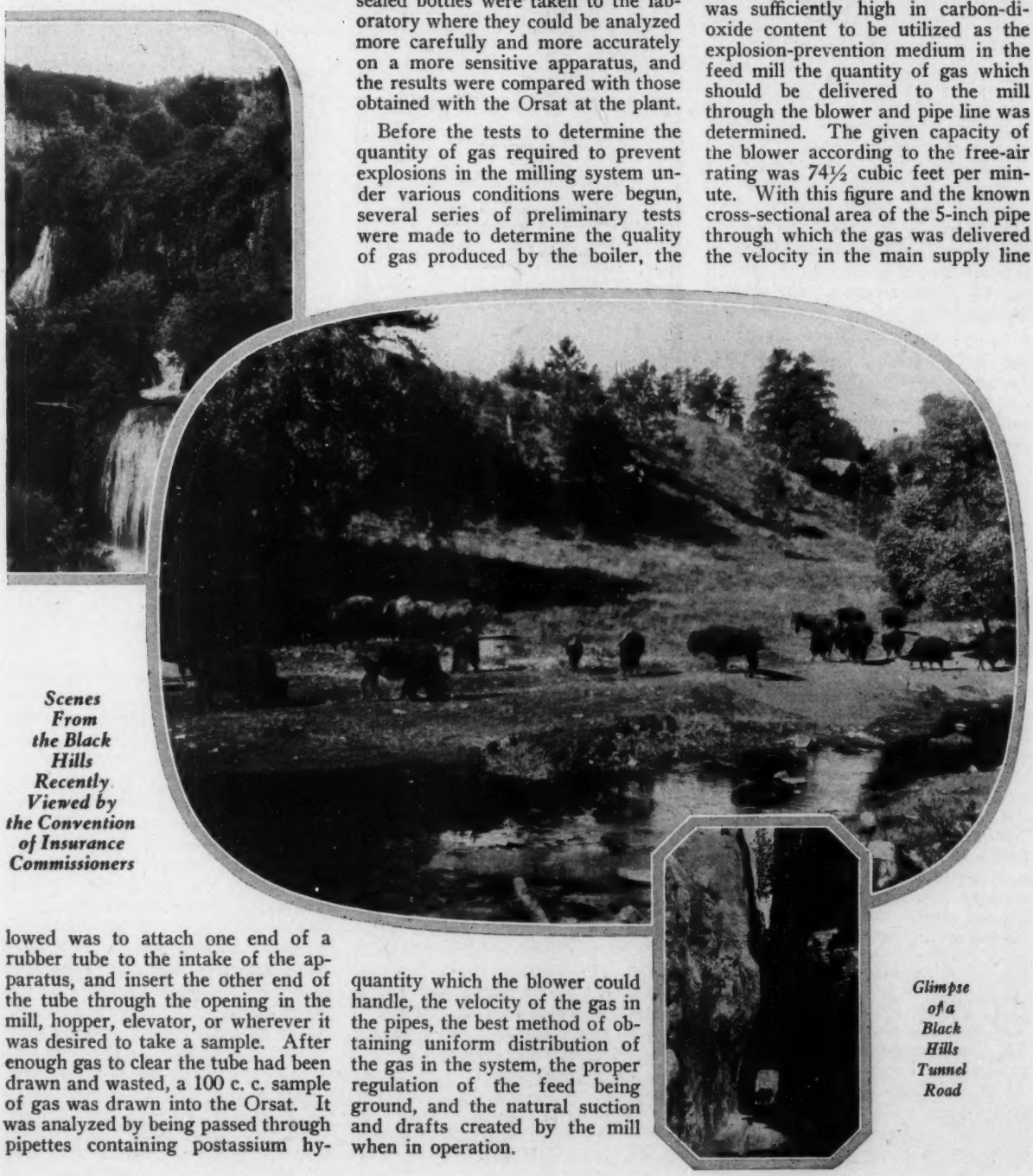
points. Openings through which samples could be drawn were made in the base of the mill, in the hopper, in the feed bin, in the elevator boot, in the elevator head, in both the up and the down leg, in the pipe line entering the building, and at the boiler.

Orsat apparatus of a standard type was used for the gas analysis. In taking a sample the usual method followed was to attach one end of a rubber tube to the intake of the apparatus, and insert the other end of the tube through the opening in the mill, hopper, elevator, or wherever it was desired to take a sample. After enough gas to clear the tube had been drawn and wasted, a 100 c. c. sample of gas was drawn into the Orsat. It was analyzed by being passed through pipettes containing postassium hydroxide, alkaline pyrogallate solution, and ammoniacal cuprous chloride solution, which absorbed in turn the carbon dioxide, oxygen, and carbon monoxide. The number of cubic centimeters of each gas absorbed represented that part of the 100 c. c. in the apparatus or the percentage of that particular gas in the original sample. At intervals samples of gas were drawn into bottles from the same source and at the same time that the sample was drawn into the apparatus. These samples of gas in sealed bottles were taken to the laboratory where they could be analyzed more carefully and more accurately on a more sensitive apparatus, and the results were compared with those obtained with the Orsat at the plant.

Before the tests to determine the quantity of gas required to prevent explosions in the milling system under various conditions were begun, several series of preliminary tests were made to determine the quality of gas produced by the boiler, the quantity which the blower could handle, the velocity of the gas in the pipes, the best method of obtaining uniform distribution of the gas in the system, the proper regulation of the feed being ground, and the natural suction and drafts created by the mill when in operation.

As soon as the mechanical equipment was operating satisfactorily, tests were made to determine the quality of gas produced by the boiler. The analysis of the samples of gas collected at the boilers under different weather conditions and different firing conditions also served to check the operation of the Orsat apparatus. It was found that the carbon-dioxide content of the gas coming from the boiler ranged from 8 to 12 per cent.

When it was found that the supply of gas obtained from the boilers was sufficiently high in carbon-dioxide content to be utilized as the explosion-prevention medium in the feed mill the quantity of gas which should be delivered to the mill through the blower and pipe line was determined. The given capacity of the blower according to the free-air rating was 74½ cubic feet per minute. With this figure and the known cross-sectional area of the 5-inch pipe through which the gas was delivered the velocity in the main supply line



Scenes From the Black Hills Recently Viewed by the Convention of Insurance Commissioners

Glimpse of a Black Hills Tunnel Road

was calculated to be 546 feet per minute. An anemometer fitted into the supply pipe indicated an average velocity of 537 feet per minute. It was assumed, therefore, that the blower was delivering gas at approximately its rated capacity. This quantity of gas was too large, however, for a milling system of this type, especially since all joints had been made as tight as possible. Recirculating the feed also helped to make unnecessary such a large quantity of gas. Moreover, it was objectionable because its escape from the few openings available in the milling unit would carry quantities of dust out into the atmosphere of the room where it would be necessary for employees to work. Accordingly, the valve in the by-pass around the blower was opened so that only a part of the output of the blower was delivered into the pipe. The remainder was recirculated. This method made it possible to control the gas so that the quantity entering the mill was only slightly more than enough to take care of the natural leakage.

In addition to the analyses made at the boiler house, samples of gas drawn from the main supply pipe and various points in the milling system were analyzed for the purpose of comparison and to determine how uniformly the gas was being distributed. The gas in the main supply pipe differed very little from that at the boiler, but slight differences were noticed in the samples of gas drawn from different parts of the inclosed unit at the same time. An attempt was made to regulate the flow of gas in the branch pipes so that uniform readings could be obtained at various points, but it was soon found that the early discrepancies were owing to differences in temperature and that the gas could be distributed uniformly without regulating the valves. In fact, it was possible to distribute it uniformly by closing the valves in all pipes except the one leading to the hopper of the grinding mill. In this particular system the gas admitted at the mill hopper mingled with the feed and was circulated throughout the system, producing a uniform mixture of air and gas.

OWING to the frictional heat produced by the mill during grinding, the temperature within the mill was much higher than elsewhere. Almost all the tests were made in cold weather, when there was an appreciable difference between the temperature inside and outside the mill. It was necessary therefore to allow for the difference in temperature between the place at which the sample was taken and the place at which it was analyzed, or to establish uniform conditions before making the analysis. When the Orsat apparatus was used such precautions were necessary, since often there was a difference of 70° F. between the temperature inside and outside the mill. As the volume of a gas under constant pressure is proportional to its absolute temperature, a 100 c. c. sample collected at the mill where the temperature was 100°, would decrease in volume to 87.8 c. c. at the outside temperature of 32°, and the number of cubic centimeters of the various constituents indicated by the analysis would not be that part of 100 c. c., but a part of the volume to which the original 100 c. c. sample contracted during the test. This condition was controlled by water-jacketing the measuring tube of the Orsat apparatus and by allowing samples of gas taken at various points to cool to a uniform temperature before the analysis was made. In making the explosion tests, however, it was desirable to attempt to ignite the dust as soon as possible after drawing the sample. Accordingly, two samples were taken, one to be analyzed at once, to obtain an approximate idea of the quantity of gas present, and another to be analyzed when better control of conditions was possible.

NINTH
ANNUAL MEETING
NATIONAL
ASSOCIATION
AUTOMOTIVE
MUTUAL
Insurance Companies
GROVE PARK INN
Oct. 22, 23, 24, 1928

A sufficient number of samples were analyzed to indicate the approximate proportions of the various component parts of the gas being used, but only the carbon-dioxide content was determined immediately before an explosibility test was made. The percentage of the other gases was either estimated or determined afterwards. In this way the operator was assured just before making an ignition test that sufficient inert gas to prevent a serious destructive explosion was present, and the time between taking the sample and making the ignition test was so short that the possibility of a change in the quality of the gas was reduced to a minimum.

Regulation of the feed entering the mill was one of the factors requiring attention. When gas was entering the inclosed unit through the feed-hopper connection only, it was found that the natural suction of the mill increased in proportion to the quantity of feed entering. Accordingly, when the feed was heavy a larger quantity of gas was drawn in, and a higher carbon-dioxide content was obtained within the system. These observations indicated the possibility of dispensing with the blower in some systems and utilizing the natural suction of the mill to draw in the required quantity of inert gas. In this particular system, however, the boilers were connected with high brick chimneys, and the suction of the mill was not able to overcome the natural chimney draft sufficiently to obtain the required quantity of gas. Tests conducted while the blower was not operating and with the by-pass open to form a direct connection between the boiler and the mill showed that the suction and natural draft balanced within the pipe line near the mill, and the mill was able to obtain gas only intermittently as the balance point fluctuated back and forth within the pipe.

Anemometer and manometer readings showed that the velocity or pressure of the gas in the distributing pipes had little or no effect on the distribution of the gas within the milling system. The natural drafts created by the operation of the mill and the bucket elevator as well as the passing of the feed through the spouts and hoppers served to mix thoroughly and distribute through the milling system the gas introduced into the mill at the breather just below the feed hopper. As a result of these tests it is felt that when necessary or desirable inert or flue gas could be forced for considerable distances in small pipes under pressure instead of low-pressure fans and large-diameter wind trunking being used, as is now the custom. The pressure could be reduced before the gas entered the milling equipment or

the gas could enter at the higher pressure, provided it had no disturbing or injurious effect on the process or the material.

After the preliminary tests showed that the plant was operating as desired and a sufficient number of gas analyses and check tests had been made to assure the operator that the quantity and quality of gas within the mill could be fairly well controlled, tests were started to determine the point at which just enough gas to prevent an explosion was present.

Explosibility Tests

IN MAKING the explosibility tests a record was kept of the temperature inside and outside the plant, the barometer reading, and the wet and dry bulb readings. Special attention was given to these conditions when explosions were produced in order to determine what effect, if any, such factors would have on dust ignitions.

As earlier laboratory and small-scale tests had shown that oat, corn, or wheat elevator dust is not explosive when suspended in atmospheres containing from 14 to 14.5 per cent oxygen, the first attempt to ignite the oat-hull dust within the mill was made when the gas analysis showed 8.2 per cent carbon dioxide and 12.5 per cent oxygen in the mill. It would not ignite. Later, when the mill had been grinding for some time and more fine dust was being circulated, a still lower oxygen percentage was obtained before an attempt was made to ignite the dust. Several tests were made when the analysis of gas samples collected from the chamber below the mill showed that they contained approximately 9 per cent carbon dioxide and 11.5 per cent oxygen. Although the electric arc was probably a more certain and a more intense source of ignition than would be found in actual practice, the dust did not ignite.

Then began a series of tests in which the quantity of flue gas entering the mill was gradually reduced, and consequently the oxygen percentage of the atmosphere within the inclosure was increased. These tests were continued until the carbon-dioxide content had been reduced to 4.2 per cent and the oxygen increased to 16.5 per cent, when an ignition and slight concussion followed the lighting of the electric arc. The base of the mill filled with flames, smoke or dust was forced from cracks in the equipment, and the cover of the opening on top of the feed hopper above the mill was lifted partly off.

Additional series of tests were made from time to time under different weather and operating conditions. Each time the mill was filled with inert gas until the oxygen percentage was reduced to a point at which it was known no ignition could be produced. Then while attempts were being made to ignite the oat-hull dust the oxygen percentage was allowed to increase gradually until it reached the point where an explosion occurred.

A sample of gas was drawn, and at least the carbon-dioxide content was determined before each attempt to produce an explosion. As the critical point was approached samples of gas were taken in bottles to be analyzed more accurately in the laboratory, and the results were checked against the results obtained with the Orsat apparatus at the plant. Hundreds of analyses were made.

EIGHTEENTH
ANNUAL MEETING
of the
NATIONAL
ASSOCIATION
MUTUAL
Casualty Companies
GROVE PARK INN
Asheville, N. C.
Oct. 22, 23, 24, 1928

About 50 explosions took place in the mill. It was not possible to start an explosion when the oxygen had been reduced to 15 per cent. In a few cases the dust ignited when the oxygen content was 16 per cent, and explosions resulted almost invariably when 17 per cent of oxygen was present. It should be remembered, however, that these figures apply only to the grinding of oat hulls under the conditions and with the equipment described. It is not intended that they should be taken as an indication of the condition under which other products could be safely ground in equipment of different types. In fact, 12 per cent oxygen, which was recommended as a result of the early laboratory tests already referred to, should be used to insure 100 per cent protection. The fact that no explosions were obtained in the mill when the oxygen content was less than 16 per cent would indicate that the most favorable conditions for an explosion did not exist at the time the ignition test was made. The degree of fineness of the dust, the moisture in the dust, the percentage of volatile matter it contains, and the density of the dust cloud are factors which must be considered in determining explosibility. Undoubtedly the fluctuations in the volume of feed passing through the mill and the intermittent operation of the plant had some effect in producing conditions unfavorable for an explosion.

From a study of the temperature and barometric readings taken at the time the explosion tests were conducted it appears that weather conditions have little or no effect on the explosibility of material being circulated within the milling system, provided the operating conditions are uniform. With the mill operating at constant speed and with a regulated flow of feed through the plates a temperature of about 100° F. was maintained in the chamber directly below the mill.

A SERIES of demonstrations to acquaint manufacturers and users of grinding equipment with the possibilities of inert gas for explosion protection were given. The demonstrations were attended by representatives of various industries, such as manufacturers of mill machinery, dust collectors, chemicals, wood flour, films, ground cork, insecticides, and feed, by representatives of insurance companies and railroads operating grain elevators, and by officials of various organizations.

In giving a demonstration the method of obtaining the inert gas from the boiler flues, the equipment which forced it through the pipe line from the boiler house to the feed mill, and the method of distributing it to various points in the milling system were explained, and the electric arc as a source of ignition was pointed out. Attention was called to the location of safety vents which released the pressure of an explosion to the outside of the building. Then the machinery was started to show the system of feed circulation.

When an analysis showed that the content of inert gas was sufficient to prevent an ignition, the electric arc was turned on, and through the observation window it could be seen burning in the dust cloud directly below the attrition mill without causing an explosion. The control valves were then closed sufficiently to reduce the flow of flue gas and thus reduce the percentage of inert gas within the

(*Continued on Page* 31)

They Trebled Profits

(Continued from Page 24)

waste. Every policy in a Mutual office is propaganda against waste, against the preventable destruction of property. Observance of the rules of safety is a lusty growth in every self-respecting community. The simple precautionary rules against avoidable waste preached and practised by mutual membership are gradually assimilated by the public intelligence, and become the fixed habits of daily life. Manners which are learnt in good society are communicable. "Men catch them," says Emerson, "from each other." It is the key to our habits. The lesson is stereotyped and becomes the mode. It is the cumulative influence of imitation in well doing. That is the missionary work of the Mutuals and their expansion marks the genius of the people who support them.

All the British Stock Companies operating in America, with one exception, acknowledge with gratitude the marked reduction in American fire losses last year. On the other hand, we are told that some of the American Companies are driven more and more to depend upon their investments as an important source of profit. For this reason they have sought big figures in their premiums for the sake of accretion to their fund, and consequently resent the efforts of the State Insurance Superintendents to bring into account the income interest in assessing premium rates, "a practice distinctly strange to us on this side." Of course it is, because we have no knowledge of any kind in this country about rate fixing. It is all locked up in the strong room of the Tariff Companies, who fix what rates they can and on any basis they like. In this respect, England may be said to be the elysian fields of stock fire insurance. When John Bull wakes up, as in due course he must, the British Companies will also convert themselves into Finance Companies. It is clearly their line of retreat when the game is up.

The Chairman of the London & Lancashire recently deplored four extraordinary disasters which had happened in America last year, because they cost his company $240,000 in claims; the Mississippi flood, the St. Louis Tornado, the gas explosion in Philadelphia and the wreck of the Principessa Mafalda. "Imagine," he said, "if these events had not taken place we should have made $240,000 more profit." But, on the other hand, he did not regret it, "because if we were immune from such events we should lose a "substantial share of our premium income in other profitable directions." It is necessary to lose a little occasionally on the swings in order to make more money on the roundabouts. But the stockholders are assured they will not become seriously involved in swing losses. It only amounts to the cost of a sprat in order to catch a mackerel. What is $240,000 to the Chairman of the London & Lancashire? I am told it is only a little over one year's salary and commission paid to him by his Company. This year the London & Lancashire paid 85% on the capital, only half of which was subscribed by the stockholders, the other half having been paid by the policyholders and appropriated from their so-called reserves.

SIDE by side with the announcement that some of the American companies are gradually developing into Finance Companies we have the following disturbing statement by the Chairman of the Royal:

"A recent development in the United States which is of considerable interest is the flotation of a number of insurance companies. Some of them are capitalized on a scale which indicates the creation of extensive organizations which will doubtless materially increase the already keen competition, especially for the better class business. This is a feature we are prepared to meet." Or as, the excited pugilist said, "Let them all come." But the Chairman of the Royal has nothing to complain of if American financiers also desire to enter this Eldorado to exploit their own people in the name of common service, and "so fulfil the law." The Royal this year paid a dividend of over 70%, mainly made in America and on a capital largely created by appropriations from the reserves, not from cash subscribed by stockholders. Furthermore, they appropriated this year a further sum of $2,800,000 from the reserves for further additions to the capital.

"What has been paid for by the people," said Franklin, "belongs to the people." The American State Insurance Superintendents and others appear to have had a glimpse of this truth, so the Trust Companies are busy converting their reserves into capital. The Royal, the London & Lancashire, and the others, since the end of the Great War have not only paid back to the Stockholders *each year* all the subscribed capital, but a very handsome bonus in addition. During each year of the War the Royal paid a dividend of over 100 per cent.

WHAT think you of all this, my patient reader? Think it out. It is the thinking man who the insurance profiteers fear most. He is the worst enemy of all manufacturers of sham. "When such a man is announced," said Carlyle, "new emissaries are trained, with new tactics, to, if possible, entrap him, and hoodwink and handcuff him." Be loyal to your own thinking. Believe your own thought. "Speak your latent conviction," said Emerson, "and it shall be the universal sense."

To emerge the common interests into a strong financial fellowship to meet common disasters not known beforehand nor selected by any traceable law "is a direct contribution to those immeasurable forces of character on which civilization itself is founded. Its value cannot be measured by figures."

To convert this noble principle, by all sorts of devices, into a large profit-making business for the benefit of people outside the partnership, is an arrangement not for the public interest and harmful to the life of the Commonwealth. Think it out!

Surety

(Continued from page 22)

the widely recognized principle in sound insurance of scattering risks and limiting them on any particular subject applies equally as well in the bonding business as in the field of insurance proper. Much re-insurance of an excess of coverage is common in the insurance field. Similarly, in writing certain classes of bonds, it is more or less common, it is held, for surety companies to reinsure a part of the risk with other high-grade companies.

Parley Vous?

The school teacher had suddenly recollected that the day was the anniversary of the birthday of Joan of Arc.

"I wonder," she wondered aloud, "if any of my little pupils can tell me the name of the best loved girl in all France."

"Aw, dat's easy," snorted a small boy, whose father had been a private in the A. E. F. "Mademoiselle from Armentieres."—*Ex.*

No Mormon

"Allow me to present my wife to you."

"Many thanks, but I have one."—*Centre Colonel.*

Naturals

"It's a wonderful age we are living in. Serviceable bones are being manufactured from celluloid, and—"

"Heavens, it seems utterly impossible!"

"It's a fact, though—I shot a game with a pair of them yesterday."—*Ex.*

Photo by P. & A.

In Many Communities the Dividing Line Between the City and the Farm Is Becoming Only the Distance Across the Street

Consistency in Insurance Terminology

Some Pertinent Suggestions Concerning the Need of Calling Things By Their Right Names to Avoid Confusion

By V. N. VALGREN
Washington, D. C.

CONSISTENCY has been called a jewel. If consistency had sole claim to be so called, there would be very faint suggestions of jewels to be found in the terminology adopted to describe the various forms of insurance offered to the public. Simplicity and brevity seem to have been given substantial consideration in the selection of these names, but logic consistency, and even in some instances the basic meaning of words have been largely disregarded. In fact here if anywhere consistency is conspicuous by its absence.

Life Insurance is protection against loss resulting from premature death, and Health Insurance offers indemnity for loss resulting from failure of health. But Fire Insurance is protection against property loss resulting from fire, and similiarly Windstorm Insurance, or as it is often too narrowly termed "Tornado Insurance," is insurance against property loss from windstorm. In the first two forms mentioned it is the subject-of-insurance that gives the name, while in the second two it is the hazard insured against in each case, that is used to identify the form.

Most of the numerous other forms of insurance have been named according to one or the other of the two methods just indicated. To cite a few of these, we have Plate Glass Insurance, Steam-boiler Insurance, Fidelity Insurance, Livestock Insurance, Crop Insurance, Automobile Insurance. Each of these has been named from those things to which the insurance, applies,—the subject of the insurance. The name in each case represents a form of property or an attribute which it is desirable for the owner to preserve and to be deprived of which entails an economic loss.

AS FURTHER examples of the second group or class of insurance names may be cited Accident Insurance, Hail Insurance, Burglary Insurance, Explosion Insurance, Earthquake Insurance, and these together with Fire, and Windstorm Insurance by no means exhaust the list. These in each case are named not after the valuable things or attributes against the loss of which the buyer of insurance desires to protect himself, but instead bear the name of the hazard against which protection is in effect provided, by means of indemnity to cover the economic loss.

Is there any explanation to be found of this shifting from the subject-of-insurance to the hazard involved, in the selection of names for insurance forms? The principle at least partially adhered to in the matter appears to be this. When the insurance covers all hazards, or at any rate a variety of hazards, to which a class of property, or other thing of value, is exposed, then the subject-of-insurance gives the name to the form in question. When on the other hand the form of insurance to be named covers but one out of a number of hazards to which the subject-of-insurance is exposed, then this particular hazard gives the name to the insurance. The application of this principle seems to have suggested itself as a matter of convenience in order to avoid long and cumbersome names. Other considerations than convenience or brevity may however have entered into the choice.

Life insurance, for instance, covers such a variety of hazards that to enumerate them even in major part would fill pages. It is true in this case, of course, that the whole thing from a hazard standpoint, may be summed up in the word "death." But "death insurance" was no doubt considered a repellent term, while "life insurance" has a more attractive sound.

Accident and Health Insurance is often written or at any rate spoken of as a single form and covered in a single policy. Here the inconsistency that has already been pointed out becomes most strikingly apparent. It may also be said that in this case the inconsistency seems to have a minimum of justifi-

cation. "Personal safety and health insurance" would have been a satisfactory and self-explanatory name. So also would have been "accident and sickness insurance" if for any reason a name based on the hazards involved, was considered preferable. Either of these names would have obviated the mental summersault that is now required of the uninitiated in arriving at the significance of "accident and health insurance" from the meaning of the words that compose the name.

THE name Use and Occupancy Insurance applied to a form of coverage by which a manufacturer or a merchant may safeguard himself against loss of income due to interrupted business occasioned by fire or other stipulated hazard, is somewhat self-explanatory, but "business interruption insurance," a term which is less frequently used seems considerably more exact as a descriptive name. This is particularly true by reason of the fact that use and occupancy insurance is not applied to residence property where instead a Rental Value policy is offered to protect against loss of use pending reconstruction or repairs after damage from fire or other stipulated hazard. Either of these terms, of course, place this insurance in the group wherein the name is derived from the subject-of-insurance.

Rain Insurance is quite as logical a name as fire insurance or other names derived from hazards insured against. It is somewhat unfortunate, however, in that rain to many if not to all persons brings to mind an indispensable benefit rather than an evil or a hazard that needs to be guarded against. Certainly to all directly or indirectly dependent upon agriculture for an income, "rain insurance" suggests that the benefits from rain are to be guaranteed rather than that losses resulting from the occurrence of rain will be offset by indemnity. While this tendency to misinterpretation is obvious as well as unfortunate it is difficult to suggest a more appropriate term. Named from the subject-of-insurance, "special event income insurance" would somewhat describe it, but this name is not only long and cumbersome, but it is open to misinterpretation almost as objectionable as that just pointed out in connection with the present name. Using the subject-of-insurance as the name would here, as in other cases, imply that the insurance covered against all, or at least a variety of hazards, while in fact loss due to rain only is covered.

Automobile insurance has already been mentioned as a form or kind or coverage named from the subject-of-insurance. When we come to the more specific forms of protection included under this general term, however, namely Theft, Fire, Collision, Property Damage, and Public Liability, then it is the hazard rather than the subject-of-insurance that lends the name to the form. The term here considered illustrate perhaps better

than any other group of insurance terms, the principle pointed out in a preceding paragraph that seems to govern in the choice between the subject-of-insurance and the hazard in giving name to the insurance form or coverage.

NOWHERE in insurance terminology is the disregard of consistency more marked than in the names for coverages of transportation risks. Here we have Ocean Marine Insurance and Inland Marine Insurance. The inventor of the term "ocean marine" may be forgiven notwithstanding that the two words etyomologically have much the same meaning, but it is difficult to justify or forgive the inventor of the term "inland marine insurance," assuming that he also gave the term the meaning now assigned to it. As used to designate insurance on lakes, rivers and canals, the term is perfectly good. But when applied also to transportation risks connected with trucking or railroading even in the States of Wyoming and Nevada the term becomes difficult for the layman to comprehend or to accept. It is not quite so bad as the name "Holy Roman Empire" which was adopted by the successors of Charlemagne for their Frankish Kingdom, and which historians tell us was neither holy nor Roman nor an empire. The coverage in question is insurance, and it deals with inland risks, but in part at least it applies to transportation from which all marine hazards are absent.

Some readers will perhaps call to mind Shakespear's challenge: "What's in a name? A rose by any other name would smell as sweet." Others may point out that insurance terms are at least as consistent and logical as human names when likely as not Mr. Stout may be slim, Mr. Long may be short, Mr. White may be dark, Mr. Bishop may be a jockey, and so on.

Right here it may be said that there is no expectation on the part of the writer that upon the appearance of this article a general convention of insurance interests will be promptly called to consider the question of greater consistency and more clearness and self-interpretation in insurance terminology. A general revision is neither necessary nor expedient. Most insurance terms serve their purpose well. They are as a rule terse and convenient, and these qualities are fully as important as rigid consistency. But a few of these terms are needlessly vague or misleading.

Protection against windstorm, for example, has hitherto been written by numerous companies under the name of "tornado insurance." Others have written and many still write such protection under the name of "cyclone insurance." Many persons, it may be recalled, use the term "cyclone" when in fact they mean "tornado." The former, properly considered, is a wide circular movement of the atmosphere, hundreds or perhaps a thousand miles in diameter. The tornado is the local "twister" which is characterized by a funnel-shaped cloud and which often leaves little but wreckage behind in its relatively narrow path. Now either of these terms as applied to protection

(Continued on Page 31)

Inert Gas

(Continued from Page 27)

mill to the point where the dust ignited. Owing to the damping effect of the inert gas remaining in the mill, the resulting explosion was just sufficient to fill the mill with flames, force dust and smoke from cracks or small openings in the equipment, and then vent itself without damaging the mill, by forcing off the cover of the feed hopper.

As a result of these demonstrations a number of companies have installed inert-gas equipment in their mills, so that it is now possible for anyone interested in the use of inert gas for explosion prevention to see not only the demonstrations in the experimental plant but large-scale systems in industrial plants.

(Continued in our next issue.)

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Investment Policies

(Continued from Page 10)

good loans, that is to say the interest payments and the principal when due have been met almost without exception, if indeed there are any exceptions. Generally speaking these housing loans have been made long term loans, generally for fifteen years, and while the housing shortage has been in large measure reduced, there is still a steady demand for these loans for small houses and for low rental apartments. Each week the Metropolitan loans on the average not less than $5,000,000 on mortgages, for housing, for business buildings and on farms.

One special form of investment was authorized by the New York legislature a few years ago when the housing shortage was most acute. Until the passage of a special law to relieve the shortage, life insurance companies operating in New York could not own real estate except such as was needed for the conduct of their own business. This was a law which grew out of the Armstrong Investigation about twenty years ago. The new law was an unusual law and the Metropolitan was the only life insurance company which availed itself of its provisions. This law provided that apartment houses might be built by a life insurance company provided the rental did not exceed $9 per room, per month.

THE Company decided to try the experiment. It selected land in Long Island City, easily accessible to Elevated railroads by which as a central point the New York Central Railroad Station could be reached within twenty minutes. The land in Long Island City could be had at a comparatively low figure. Then came the question of material and labour. Organized labour agreed to cooperate with the Company in doing a prompt job at which complications in the way of labour disputes would be avoided, and they made good on their declaration almost without exception. All building material was high-priced after the war. The Company sent to Holland and bought bricks, and because the land where the buildings were to be put up could be reached within a very short distance by water transportation, they could be delivered where they were wanted for building at a price which made construction possible. For the trim and other timber which was needed the Company sent to Oregon, purchased the material there and shipped it by water through the Panama Canal, and it also was delivered at almost the very place where it was to be used, through the water channels of the East River in New York and a small creek emptying into that river. The Company invested about $7,000,000 in the construction programme and the blocks of apartment houses when completed had accommodations for upwards of 2,000 families. They were prepared by an architect who had given years of study to how to construct apartment houses which should be light, sanitary and convenient. When the apartment houses were ready they were all filled at once and they are all filled now and have been ever since. There has been no default on rent and it is interesting to note that while the maximum rent which may be charged per room per month is $9.00, the houses have been operated with a profit of more than 8% on the investment.

Insurance Terminology

(Continued from Page 30)

against windstorm is needlessly misleading. Not long ago a well trained man, though a layman in insurance matters, inquired of the writer how the companies that wrote "tornado" insurance in actual practice determined whether damage to insured property was in fact from a tornado or from some other form of windstorm. The answer was, of course, that though called tornado insurance it is really windstorm insurance, and that the exact nature of the storm that causes the loss is of no special importance in connection with the adjustment. To misrepresent one's goods by applying a name that implies qualities not possessed by the goods is unfair. But to misrepresent by the use of a name that underrates the quality or value of one's goods, be it an insurance policy or anything else, would seem to be not only unfair but a blunder. Why not use a name that is as broad as the hazard covered and call this form of protection Windstorm Insurance?

Why not also generally substitute the more accurate term Business Interruption Insurance for the less self-defining term Use and Occupancy Insurance, the more logical and more readily comprehended term Accident and Sickness for the rather illogical combination of Accident and Health? And by all means let us call honest-to-goodness Inland Transportation Insurance what it is and always has been and not drown its meaning to the public, in the word marine.

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